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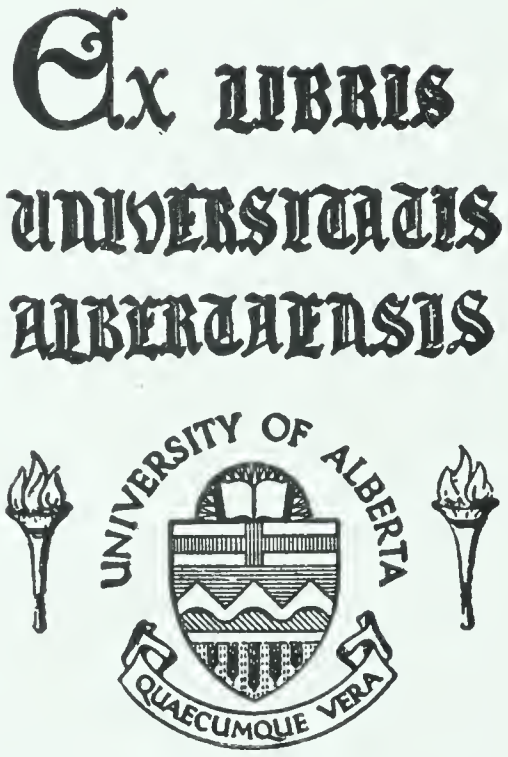

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SELECTED AGRICULTURAL PRICE POLICIES: A THEORETICAL EVALUATION IN THE CANADIAN SETTING

by

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A THESIS

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The undersigned certify that they have read, and recommend to the Faculty of Graduate Studies for acceptance, a thesis entitled "Selected Agricultural Price Policies: A Theoretical Evaluation in the Canadian Setting," submitted by Alexander Frederick McCalla, in partial fulfilment of the requirements for the degree of Master of Arts.

SELECTED AGRICULTURAL PRICE POLICIES: A THEORETICAL EVALUATION IN THE CANADIAN SETTING

Abstract

In an effort to solve the farm problem, very different types of agricultural price policies have been recommended over the years. This thesis selects two of these policy approaches for testing and evaluation in terms of Canadian policy needs. The basic question asked is the following: is either policy desirable and sufficient as a solution to the Canadian farm problem? The concept of forward pricing involves the announcement, prior to the beginning of the production cycle, of estimated equilibrium prices likely to exist at the time of marketing. This policy attempts to improve the resource allocative function of the price system by increasing price certainty to guide production planning. The policy approach of aggregate supply control proceeds from the assumption that agricultural supply will always outrun the demand for food and therefore supply must be adjusted directly through policy to achieve "fair" prices for agriculture. Both policy approaches are generally directed at the problem of low per capita farm income vis a vis the non-agricultural sector of the economy.

Each policy is tested for its theoretical consistency, and each is found to be deficient. Forward pricing proceeds from the assumption that increasing the efficiency of resource use will necessarily improve the income position of agriculture. This assumption is questioned on the basis of the applicability of the competitive model to an imperfectly competitive economy. The major assumption underlying the concept of supply control is that agriculture is non-price responsive. The theory of the treadmill postulates that farmers will continually introduce supply expanding innovations regardless of the price and profit conditions prevailing. This theory is questioned by theoretical analysis and empirical findings.

Neither policy is free from operational limitations and it is concluded that neither policy, given its weaknesses, offers a significant enough improvement to justify implementation in Canada. Neither policy solves the basic problem of Canadian agriculture, namely an excess of human and land resources relative to other sectors of the economy. This problem is not solved successfully by a price policy alone.

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The development of a student depends heavily on the contacts he has with Professors. To this end I wish to express my gratitude to the members of the Department of Political Economy, University of Alberta.

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CHAPTER 1

INTRODUCTION AND BACKGROUND

I. Objective of the Thesis

The objective of this thesis is to evaluate, in terms of Canadian conditions, two agricultural price policies formulated in the United States. The policies stem from two divergent streams of thought in agricultural economics. The "conservative" school places much reliance in the price system as a means of solving the "Farm Problem," while the "radical" school has little faith in the price system as a means of solving the problem. Specifically the study will attempt:

1. to test the theoretical consistency of the policies,
2. to consider the applicability of the policies to the Canadian economy,
3. to contrast the policies with the hope of indicating a preferred direction of policy for the solution of the Canadian farm problem.

A. The Reasons for the Study

The reasons for undertaking this project can be outlined briefly. The discussions of agricultural policy in Canada are blurred by the differences in the conception of the agricultural problem and more generally, the conception of agriculture. A fresh look at agricultural recommendations in theory and in practice seems useful. To do this two specific price policies of United States origin will be compared and evaluated within the context of Canadian conditions. Canada will be used to contrast these policies for two reasons each of which will be discussed more fully in the

second section of this Chapter. The first reason is because the structure and nature of Canadian agriculture exhibit many similarities to the United States counterpart; and second because Canadian agricultural policy has never contained an explicit concept of parity. It seems likely, though not proven, that Canadian policy has been somewhat less oriented in the direction of income support and has been less rigid than United States policy. This difference in policy will be used as a basis of comparison.

A division of agricultural economists into two schools could probably be made; those believing in the allocative efficiency of the price system and those who question its value. Such a division is indicated by the wide differences that exist in the types of policy recommended.[1] On the one side, while hardly anyone now advocates the complete freedom of the price system, many economists emphasize the importance of allowing the price system to perform its resource allocation function with as few restrictions as are compatible with social justice and equality. This school of thought adheres strongly to traditional economic theory, emphasizing that the price system, while imperfect, is superior to any system of administered prices for the accomplishment of optimum resource allocation and movement. The other extreme is represented by a limited group who have analyzed the workings of the price system and have concluded that the free market is and will continue to be ineffectual in solving the basic problems of agriculture. A representative policy program stemming from each of these schools of thought has been selected on the basis of the difference in the role assigned the price system in agricultural policy.

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[1]See John D. Black, "The Extremities of Current Agricultural Policy Proposals," Quarterly Journal of Economics, LXXII (August, 1958), 307-326.

The forward pricing approach, which is generally identified with the traditionalists centered at the University of Chicago and particularly with D. Gale Johnson, is selected for study representing a policy heavily dependent on the operation of a modified price mechanism to improve the relative position of agriculture. The policy of aggregate supply control, whose most persistent exponent is Willard W. Cochrane, will be considered as a policy which administers the supply function to induce the market to provide higher prices. In other words, supply control does not administer prices directly but changes one of the determinants of price. That two groups of reputable economists using accepted economic analysis and principles can arrive at such different conclusions invites careful consideration. The basic question arises: is economic theory of less use from the practical point of view than economists suggest or is there a fundamental difference in the goals of agricultural policy propounded by the two schools of thought. On these grounds the study will attempt to clarify the apparent conflict with special reference to Canadian agricultural conditions. The study is essentially a review of existing literature. The originality, if any, lies in the different approach to the question of economic theory and agricultural price policy, especially Canadian policy needs.

B. The Course of the Study

The second part of this Chapter will define the Farm Problem in general terms as well as outline the activities of Government in attempting to solve the problem. A brief attempt will be made to outline the similarities and differences between United States and Canadian agriculture and agricultural policy.

Chapter Two will deal with the first of the two policy proposals

referred to above, viz. the proposal to remove price uncertainty from the agricultural market by the announcement of forward prices at least one production period in advance. The rationale is that price uncertainty in the market hinders the farm entrepreneur from making decisions leading to optimum resource allocation. The development of the concept of forward prices will be reviewed giving special reference to the major work in the field, Forward Prices for Agriculture.[2] The principal objective of Chapter Two then is to provide an historical and descriptive background of forward prices as an aid to evaluation in later chapters of the theoretical and practical features of an agricultural adjustment program using forward pricing.

Chapter Three will deal with policy of aggregate supply control initially advocated by Willard W. Cochrane in Farm Prices, Myth and Reality.[3] The recommendation for direct control of agricultural output is postulated on the assumption that aggregate supply will continually out-run aggregate demand for agricultural products. The main intent of the chapter will be to outline the major tenets of the supply control approach to agricultural adjustment as a basis for future analysis. In addition, an attempt will be made to trace the conceptual beginnings of the line of thought that leads Professor Cochrane and others to express such little faith in the unfettered price system, as a mechanism leading to the ultimate solution of the farm income problem.

Chapter Four will set the policies side by side for a critical evaluation of their theoretical soundness, and will also trace the likely

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[2] D. Gale Johnson, (Chicago; The University of Chicago Press, 1947).

[3] (Minneapolis: The University of Minnesota Press, 1958).

outcome of the implementation of either forward pricing or aggregate supply control. Chapter Five will complete this contrast by discussing the likely practical limitations to the application of forward pricing, supply control or a combination of both to the Canadian agricultural problem. It will conclude with a summary evaluation of the extent to which either policy, given its theoretical and practical limitations, is likely to achieve the goals set out for these policies. The concluding Chapter will pull together the conclusions of the study and suggest a possible direction for Canadian agricultural policy.

II. The Background

A. The Nature of the "Farm Problem"

That a farm problem exists in most developed countries is almost always accepted without question. But a definition of the problem is fraught with many difficulties and a full definition of the "Farm Problem" would require much more space than is available here. In what follows an attempt will be made to set in outline form a conception of the Canadian farm problem.

In general terms the farm problem is one of chronic income disparity between agriculture and the rest of the economy. Per capita farm income in Canada has been consistently below non-farm income for the entire period for which records are available. From 1926 to 1958, farm income per capita has ranged from a low of 30% of non-farm income to a position of 75% of non-farm income.[4] Throughout the whole period then

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[4] These figures are from Wm. Mackenzie, "The Terms of Trade, Productivity and Income of Canadian Agriculture," Canadian Journal of Agricultural Economics, IX (December, 1962), 1-13. To quote such figures

agricultural incomes have never been greater than three-quarters of comparable non-farm incomes. This is the major facet of the farm problem. But not only has farm income been lower but it also has been extremely variable. A multiplicity of factors contribute to this variability, not the least of these being weather, domestic and world market uncertainty and commodity price variability. The unique farm problem is that of a lower and more variable per capita farm income. However, the agricultural sector shares an additional problem with the rest of the economy. This is the problem of the unequal distribution of income within agriculture. For example, 38% of all farms in Canada received only 6.7% of gross revenue from agriculture. This group, sometimes called the subsistence element of agriculture, received less than twelve hundred dollars gross income per year. While the distribution problem is not unique to agriculture, failure to recognize "the lower third" as a problem of agriculture is a major omission. The designation of the three facets listed above as the "Farm Problem" is based on the assumption that it would be in the self-interest of society to achieve a situation where all sectors of the economy receive relatively stable comparable incomes in the long-run and that no people should receive less than a minimum level of income.

From an economic point of view the problem seems to resolve itself into two not entirely distinct parts, i.e. the resource allocation problem and the income problem. Implicit in the resource question is the condition of less than optimum use of resources in any or all of the following areas;

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without qualification would be misleading. The difficulties of measurement, selection of comparable non-farm income, the valuation of perquisites and the rate of return on investment all leave the possibility of quite different income estimates depending on what criteria are used. This is not the place to discuss the methodological question of the proper magnitudes to be used. Having made explicit recognition of these difficulties, it can be said that the relative position of agriculture vis-a-vis the rest of the economy is inferior on the basis of income earned.

within the farm firm, between firms within agriculture, and between agriculture and the rest of the economy. Under the assumptions of classical economic theory, the less than optimum use of resources within the firm and within the industry would yield lower incomes for agriculture. Thus the economist has argued that the solution to the agricultural problem involves the removal of excess resources out of agriculture to more profitable occupations. He has argued further that the existence of a substantial income differential in favour of the non-agricultural sector would induce resources to move out of agriculture and thus in the long run the agricultural problem would be solved. But the labor force in Canadian agriculture has been reduced by one-half since 1939 and the income problem has persisted. It therefore seems to follow that the income problem of agriculture has causative factors other than a misdirection of resource use. Perhaps part of the explanation for the continued income differential lies in the extremely rapid rate of technological innovation of the last twenty years which has increased agricultural productivity faster than labor has moved out, while at the same time the per capita demand for food has not risen substantially. In addition, Canadian agriculture has persisted for most of the postwar years in producing more output, especially grains, than the market would readily absorb at "fair" prices.

Economists all too often define the farm problem in economic terms and then seek a solution through price induced resource movement. In doing this, they have likely ignored a significant portion of the reason for the existence of the income differential. The farm unit is not only an economic firm but also a social unit affected by conditions other than those involved with the economic livelihood of the farm family. Religious, social, traditional and a host of other cultural factors mould the decisions

of the farm entrepreneur in addition to economic considerations. It is not contended here that the economist should become a sociologist as well, but it is definitely a failing on the part of the economist, the farmer and the government if they fail to recognize other contributory factors of a non-economic nature in the "Farm Problem." The problem then has been defined in economic terms as an agricultural sector which is declining in relative size and which receives a lower and more variable income per capita than do other sectors. It is explicitly stated, however, that the "Farm Problem" cannot be fully explained nor fully solved within the framework of economics. This reservation must be kept constantly in mind in the discussions of farm price policy to follow.

B. The Policy Question

The "National Agricultural Policy of Canada," which presumably is directed at the farm problem, is often debated in the political arena, within farm organizations and within intellectual groups. That such a policy exists is an implicit assumption underlying such debates. Yet it is not at all clear that a rationally constituted, consistent, all-encompassing policy exists in Canada. What exists as a policy is a collection of seemingly unrelated attempts at the solution of specific, sometimes emergency problems. The history of the Canadian Wheat Board or the Agricultural Prices Stabilization Act adequately illustrates this contention. The intent of the Government of Canada has never been spelled out with regard to long-term agricultural policy. Federal activities of long standing in the fields of research, extension and quality control seem to bear little relation to the later activities of the Government in its market intervention policies.

The agricultural economist, on the other hand, has fulfilled two

major roles in the field of policy; the role of critic of legislation introduced, and that of a builder of theoretical policy models for the total economy. The Canadian economist has been much more concerned with the first of these activities. United States economists have from time to time advocated simple and inclusive price policies for the solution of the "Farm Problem." In simple terms, the policy problem revolves around the assumptions made about the complexity of the agricultural segment of the economy, that is, can policy be designed to deal with agriculture in the aggregate. To the layman, agriculture is a heterogeneous organism. At the other extreme, the economist all too often considers agriculture in the aggregate. It therefore follows that a gap exists between the economist and the layman when policy is discussed. It is to the difference between theoretical and existing policy that some attention will be given, in a hope that at least some common ground can be suggested in the conclusions of this paper. To date the role of Government has been assumed to be an active one in agriculture.

C. The Background of Government Intervention in Agriculture

The relative importance of the agricultural sector of a maturing economy is almost without exception a declining one.[5] Economic development has been characterized by a migration of agricultural labor to a growing industrial sector.[6] It is not surprising then that in industrialized economies such as the United States, Great Britain and Canada the gainfully employed in agriculture is of the magnitude of ten per cent or less of the labor force.

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[5]See Gavin McCrone, The Economics of Subsidizing Agriculture (Toronto: University of Toronto Press, 1962), esp. Chap. 1.

[6]In a general statement of this trend see Colin Clark, Conditions of Economic Progress (2nd ed.; London: Macmillan Co., 1951), esp. Chap. 3.

An opposite evolutionary trend is apparent in the degree of government intervention in the agricultural market in these same mature economies.[7] It is seldom questioned whether government should or should not be involved in the market, but rather the degree of intervention is the issue at stake. "The principal subject of controversy is the level of such supports, not whether supports shall or shall not be provided."[8] But this almost general agreement that agriculture should be provided with some degree of protection from violent price and income fluctuations is of recent vintage. Government action in the fields of quality control, research, extension and credit granting has existed in advanced agricultural economies since before the turn of the century.[9] This type of non-market intervention was and is justified on the grounds that the atomistic agricultural producers are unable to provide these functions individually. These types of government action were not considered sufficiently inconsistent with the principle of laissez-faire to draw major attention. They are symptomatic, however, of general government concern for the agricultural sector.

The next stage in the gradual involvement of governments in agriculture was the passage of legislation permitting and in fact encouraging

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[7] See W. M. Drummond and W. Mackenzie, Progress and Prospects of Canadian Agriculture, (Ottawa, Royal Commission on Canada's Economic Prospects, 1957), esp. Chap. 12.

[8] M. R. Benedict and O. C. Stine, The Agricultural Commodity Programs (New York: The Twentieth Century Press, 1956), p. xvii.

[9] E. G. Nourse, J. S. Davis and John D. Black, Three Years of the Agricultural Adjustment Administration (Washington, D.C.: The Brookings Institution, 1937), pp. 24-25.

co-operative development. This type of legislation, common in the first thirty years of the present century, rested on the belief that the farmer faced monopoly strength in the non-agricultural sector and therefore was at a disadvantage. The principle of lending government support to self-help programs of co-operation failed to meet the test of the Depression of the 1930's. It may be safely said that direct government intervention in the market on a large scale stems from the Depression years.

With particular reference to the United States, The Agricultural Marketing Act of 1929 increased the efforts of the Government to stimulate and assist self-help programs in an effort to stabilize and to some extent stem the tide of falling agricultural prices. This period was also marked by Government purchase programs under the Federal Farm Board in an attempt to achieve "orderly marketing." This ". . . phase of postwar agricultural policy ended with government intervention in the agricultural problem not getting actively beyond the stage of influencing the flow of farm products to market through aid to co-operatives and through stabilization purchases . . ."[10] and related disposal programs of various kinds.

The entry of the United States Government directly into the market began with the Agricultural Adjustment Act (AAA) passed as part of the "New Deal" in 1933. This Act embodied primarily relief and income supplementation clauses but also showed the intention of permanent entry into the market. From the AAA stemmed most of the underlying principles evident in farm programs in existence in the United States today. The most important of these is the parity concept, defined as the restoration of the purchasing power of agricultural commodities to a level existent in the period 1909-13.

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[10] Ibid., p. 11.

The concept of parity income and price has become firmly embedded in United States farm policy.[11] While the mechanism of price and income support has become more complex, the degree of intervention by the Government has become greater in the last thirty years.[12] The most recent addition to the United States farm program is the attempt to control directly output under the provisions of the Feed Grain Program.

In Canada the trend of gradual government intervention in the agricultural market has been similar to the experience in the United States though lagged somewhat. The Natural Products Marketing (Canada) Act of 1934 was designed to stimulate the development of marketing boards in Canada. This was the first attempt by the Canadian Government to lend its support to farmers in the market. This Act was declared ultra vires in 1937.[13] The wheat market was the first place where direct intervention occured. Here a series of emergency conditions forced the Canadian Government into the market. The drastic decline in wheat prices which began in the fall of 1929 threatened to force the Western Canadian Wheat Pools into bankruptcy. Rather than face the consequences of this the federal Government guaranteed bank loans of the Pools but in return took over control of the Pools Central Selling Agency. In 1935 the first Canadian Wheat Board Act was passed which provided the farmers with a voluntary Government selling agency. In 1943 the Wheat Board was made the sole purchasing agent

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[11] For a history of the parity concept see C. C. Harris, Jr., "Parity Income Prices," Journal of Farm Economics, XLIV (February, 1962), 141-156.

[12] See J. K. Galbraith, American Capitalism (Boston: Houghton Mifflin, 1952), Chap. 12.

[13] For a more complete discussion of this phase of Canadian policy see L. E. Poetscke and W. Mackenzie, The Development of Producer Marketing Boards in Canadian Agriculture, (Edmonton: University of Alberta, 1957).

of Western Canadian wheat. "Having backed into the picture more through the force of circumstance than from any firm intention, the federal government was destined to find itself becoming more and more firmly entrenched in the grain marketing picture."[14] The Canadian Wheat Board, while still constituted under temporary legislation, is considered a permanent feature of the Canadian scene.

The Agricultural Prices Support Act of 1944 provided the first general program of price support in Canada. While the Act was intended to be an emergency program to facilitate the adjustment of Canadian agriculture to peace time conditions, it continued in force until it was succeeded by a more comprehensive program embodied in the Agricultural Prices Stabilization Act passed in 1958. Canadian legislation has never explicitly embodied the concept of "parity" despite the continued pressure of farm organizations for "agriculture's fair share of the National Income."

This cursory review of the history of government market intervention policies in Canada and the United States has two relevant features. First, it is clear that government involvement in the agricultural market has slowly evolved over time and is not likely to diminish in the near future. Second, and more important for this study, the absence of the concept of parity in Canadian farm policy yields the possibility of comparison and evaluation of policies formulated in the United States in the Canadian setting. United States policy, because of the parity concept, has been used to increase the level of farm prices and income. In addition

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[14] C. L. Barber, "The Impact of United States Farm Policy on Canadian Agriculture," in Aitken, et al. (Eds.), The American Economic Impact on Canada (Durham: Duke University Press, 1959), p. 74.

parity prices have been particularly rigid with respect to reducing the level of support once established. It is therefore contended that Canadian agriculture's adjustment to price change may be significantly different because price changes probably indicate more closely the underlying changes in the conditions of supply and demand.[15]

The nature of the agricultural sectors of the two countries is sufficiently similar that valid comparisons can be made. This conclusion follows from the basic similarities of the nations with respect to social, political and economic customs and institutions. If the atmosphere in which the economic decision is made is similar, there is no a priori reason why farmers' reactions to price and other economic stimuli should be different in the two countries.

An examination of the role of agriculture in the economies of the two nations also indicates similarities. In the United States the farm labor force is 8.5% of the total labor force and gross farm income is 7.8% of Gross National Product. In Canada the farm labor force is 11% of the total labor force and gross farm income is 7.7% of the Gross National Product. In addition the farm income problem is similar in that per capita farm income as a proportion of non-farm income is of the same relative magnitude in the two nations.[16] Structurally, while the United States produces sub—tropical commodities which are not produced in Canada, there are no

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[15] For an extensive treatment of structural similarities and policy differences between Canada and the United States see D. Gale Johnson, "Income and Resource Effects of Canadian and United States Farm Policies: A Comparison," The University of Chicago Office of Agricultural Economics, Research Paper No. 5912, April 6, 1959.

[16] Ibid.

agricultural commodities produced in Canada which are not produced in the United States. While specific differences naturally exist, it will be assumed that these differences are not sufficient to invalidate the comparison of agricultural price policies made in subsequent chapters of this thesis.

CHAPTER 2

FORWARD PRICING FOR AGRICULTURE

I. Introduction

The proposal to remove some price uncertainty from the agricultural market by the use of forward prices does not originate or end in Forward Prices for Agriculture[1]--the work given detailed review in this chapter. The choice of this work for review is based on two considerations. Firstly, Johnson was the first to publish a detailed proposal for the possible implementation of forward prices as well as a theoretical discussion of such a proposal.[2] While Schultz, Sheppard and Brownlee (all at one time Johnson's mentors and/or colleagues) had alluded previously to forward pricing as a possible policy measure, none had explicitly outlined a detailed approach. Secondly, the analytical precision of Johnson's work still leaves it as the classic theoretical treatise on the subject. This despite the fact that the book was published some fifteen years ago.

However, this chapter will not be limited to a review only of Forward Prices. In addition, an attempt will be made to trace two ideas. First, the evolution of the notion of forward prices in the period preceding

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[1] D. Gale Johnson, op. cit., hereinafter referred to as Forward Prices.

[2] See W. O. Jones, "Review, Forward Prices for Agriculture," American Economic Review, XXXVIII (September, 1948), 705.

the publication of Forward Prices, and second, the developments in the theory of forward pricing since the publication of this book. The latter objectives become more managable after the notion of forward pricing is outlined.

II. The Concept and History of Forward Prices

A. The Concept of Forward Prices

The concept of forward pricing is relatively simple. The farmer is faced with risk arising out of uncertainties of costs, prices and natural elements. Given these uncertainties, along with the long production period characteristic of much of agricultural production, the farmer cannot efficiently plan a profit maximizing output. In attempting to minimize risk, the farmer may diversify his operation, build flexibility into production plans, maintain a high degree of liquidity or simply continue traditional patterns of operation. Each of these reactions may have an economic cost of yielding less than optimum resource use. Forward pricing seeks to reduce one of the risks, product price uncertainty. Its basic principles are few:

1. The prices should be announced sufficiently far in advance to enable farmers to adjust their programs to the prices.
2. The prices should cover a sufficient period of time to permit farmers to complete their production plans with considerable certainty.
3. The price announcements should be sufficiently clear and precise so that each farmer can readily interpret their implications for him.
4. The prices adopted should be those that achieve the desired output.[3]

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[3] Johnson, Forward Prices, op. cit., p. 11.

By this policy farmers are relieved of the necessity of estimating prices likely to exist at the time of marketing. In most proposals a storage program is included to even out fluctuations in output and thus achieve the announced forward prices. The core of the proposition is that product price uncertainty prevents optimum resource allocation which in turn decreases social welfare.

B. The History of Forward Prices

The main concern of this section will be to trace the development of the concept of forward prices. From all evidence it appears that the theoretical idea of forward prices finds its base in practical usage. The earliest recorded use of guaranteed forward prices was in the United States during the latter years of World War 1. In an effort to encourage production of wheat and hogs, the Government announced floor prices a year or more in advance. With the end of the War floor prices were discontinued and the idea of forward prices with them.[4] It should be made clear, however, that the intent here was primarily production stimulation rather than direction.[5]

One of the better known published advocacies of forward pricing occured in 1928 in a report of a "Business Man's Commission on Agriculture"--a publication of the National Industrial Conference Board and the Chamber of Commerce of the United States. This commission recommended as part of a growing stabilization program that a stabilization corporation might. . .

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[4] G. S. Shepherd, "Bases for Controlling Agricultural Production," Journal of Farm Economics, XXIV (November, 1942), 743-760. This section owes much to this article.

[5] Further reference to the practical use of forward prices for production stimulation and control recurred off and on after 1919 in the United States and in the United Kingdom.

> . . . attempt the gradual control of production, so far as this can be accomplished by influencing planting intentions and programs. To this end it might eventually be possible for these corporations to announce in advance of the planting of crops a price at which they would stand ready on a specified date after the production of the crops in question to purchase any surplus which might then be offered, this price being such as would induce the desired proportion and volume of the crops concerned.[6]

This proposal, though largely forgotten for ten years, contained the basic elements of the forward pricing programs of later years.

The period of popularity of forward pricing began in 1940. In a paper presented to the American Economic Association,[7] T. W. Schultz advocated the use of storage and loan operations to . . .

> guide and direct the use of the nation's agricultural resources along lines which will optimize the use to which they are put. In order to guide production effectively, it is necessary to announce the loan rate well in advance of the time that farmers start making production plans.[8]

Schultz saw two advantages to the forward pricing scheme. First, by reducing price uncertainty the farmer could better maximize the output of his farm and second, forward prices established by a central agency would transfer the price risk to that agency. The collective knowledge and skill of the agency were seen to be more accurate in estimating prices than were those of the individual farmer. Schultz also

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[6] Quoted in Shepherd, ibid., p. 476. Also see G. S. Shepherd, Agricultural Price Policy (Ames: Iowa State College Press, 1947), esp. Chap. 19.

[7] T. W. Schultz, "Economic Effects of Agricultural Programs," American Economic Review, XXX (February, 1941), 127-154.

[8] Ibid., p. 152. The "loan rate" referred to by Schultz is the price at which the Government loans to farmers on home stored crops. If price rises above the loan rate, the farmer may sell his crop and repay the loan; if price falls below he simply yields the crop to the Government. It is a guaranteed floor price.

suggested a storage agency which would attempt through purchase and storage to maintain the announced forward price. Here then is the core of forward pricing for agriculture.

Schultz and D. Gale Johnson in 1942 published six papers[9] later reprinted in the Iowa Farm Economist in which the idea of forward pricing was expanded upon. About the same time Johnson began a thesis project dealing with the theory of forward pricing. This work will be referred to later.[10]

Shepherd continued to write on forward pricing during the war years. He dealt with the determination of time periods for price announcements and also with the cost to the nation of such a program.[11] His concern, however, became one of using forward pricing as an integral part of particular commodity programs rather than the theoretical expansion of the idea.

T. W. Schultz in Redirecting Farm Policy[12] divided the agricultural problem into two parts, first the resource allocation problem and second the income problem essentially as defined earlier. The price system was

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[9] Referred to in Shepherd, "Bases for Controlling Agricultural Prices," op. cit.

[10] The partial implementation of forward prices in the United States under the Steagall amendment, May 26, 1941 was not of the type under discussion here. Under this amendment the forward price floor was determined from a parity base rather than from anticipated future conditions.

[11] Ibid.; also see G. S. Shepherd, "Controlling Hog Prices," Journal of Farm Economics, XXV (November, 1943), 777-792; and G. S. Shepherd, "Changing Emphasis in Agricultural Price Control Programs," Journal of Farm Economics, XXVI (August, 1944), 476-502.

[12] (New York: The Macmillan Co., 1943).

applicable only to the first problem. The effective allocative function of the price system is hindered by uncertainty. Schultz again proposed the formulation of production goals in advance of the production period, with announced forward prices to achieve these goals. The four specifications of Schultz's plan were in essence those referred to at the beginning of this Chapter.[13]

The American Farm Economic Association held an essay contest in 1945 seeking "A Price Policy for Agriculture, Consistent with Economic Progress, That Will Promote Adequate and More Stable Income from Farming."[14] As an indication of the popularity of the idea of forward pricing the three top prize winning essays all embodied forward pricing schemes. Also fourteen of eighteen papers published in the contest supported some sort of minimum price commitment by the Government in advance of the production decision.[15] The winning paper by W. H. Nicholls advocated forward prices as a part of an overall agricultural policy. In contrast the second place paper by D. Gale Johnson advocated forward pricing as the main solution supplemented by a storage program and a depression income support program. The Johnson paper included the main proposals of Forward Prices and for

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[13] Above Chapter Two, pp. 17, 18; To maintain proper chronological order reference should be made to an article by Brownlee, but consideration of this article is deferred to the consideration of the practical applicability of forward prices. See O. H. Brownlee, "Some Considerations on Forward Pricing," Journal of Farm Economics, XXV (May, 1943), 495-504. Also see D. G. Johnson, "Contribution of Price Policy to the Income and Resource Problem in Agriculture," Journal of Farm Economics, XXVI (November, 1944), 631-664. Reprinted as Chapters 7 and 8 of Forward Prices.

[14] Journal of Farm Economics, XXVII (November, 1945).

[15] W. H. Nicholls and D. Gale Johnson, "The Farm Price Policy Awards 1945 - A Topical Digest of the Winning Essays," Journal of Farm Economics, XXVIII, (May, 1946), 267-283.

this reason a detailed review of this work is now undertaken.[16]

III. Review of Forward Prices for Agriculture

Forward Prices was first submitted as a Ph. D. Thesis to Iowa State College in 1945 and subsequently published in book form.[17] The detailed analysis used has strong overtones of Pigouvian welfare analysis. Johnson at the outset dismisses Keynsian analysis as being unsuitable for sectoral analysis and proceeds to use what he calls "neo-classical" partial equilibrium analysis. That what is essentially a welfare analysis, ignores Paretian "optimum" analysis is strange and difficult to understand considering the popularity of the "new welfare school" at this time.[18] The classical welfare approach used will be evaluated in terms of the "new" welfare analysis in Chapter Four.

Johnson begins with a rationale for government concern for agriculture. Agriculture is characterized by unique problems. The declining relative importance of agriculture in conjunction with rapid technological innovation, causes a problem of excess labor and lower incomes. Also because of the high rural birth rate and the declining size of the farm population, the farm family bears an excessive cost in the education of the nation's most valuable resource. Third, poverty is prevalent in

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[16] It is noted in passing that almost all the people writing on forward pricing in the period 1940-1946 were associated with Iowa State College at Ames. Schultz left Iowa in 1943, Shepherd is still at Iowa, Brownlee received a Ph. D. degree from Iowa in 1945 as did D. Gale Johnson. Nicholls was on staff at Iowa 1938-1944. Most of these people left Iowa for the University of Chicago, thus the "Chicago School" of resource allocation designation.

[17] Johnson, Forward Prices, op. cit.

[18] For a review of welfare analysis and especially the listing of the group of articles published in the period 1938-1944 by Hicks, Samuelson, Lerner, Kaldor, Reder and others see K. Boulding, "Welfare Economics," in B. Haley (Ed.), A Survey of Contemporary Economics Volume II (Homewood: Richard D. Irwin Inc., 1952), 1-34.

agriculture. As a result the nation has a responsibility to alleviate this problem in agriculture as in the rest of the economy. Fourth, agriculture is particularly vulnerable to the business cycle. And fifth, because of the small size of the farm unit, the individual unit is unable to deal successfully with technical and economic research activities. On these grounds Johnson justifies an approach to agricultural policy involving government action.

The relevant portions of Johnson's work will be summarized under three headings; viz. specific problems recognized as expressed in overall policy goals; analysis used in the approach; and the policy derived. That general government intervention is justified is assumed on the basis of the above-listed characteristics. The specific nature of intervention is the area now considered.

A. Problems and Goals for Agriculture

For Johnson, economic problems can be placed in two general categories; the resource allocation problem and the problem of income disparity between agriculture and the rest of the economy. Johnson does not suggest that the two are independent but that meaningful analysis requires separation in theory. The price problem for agriculture lies primarily in the allocative field and only to a limited extent in the income field. That is, the price system's prime usefulness is in the solution of the resource problem.

The price system performs an irreplacable role in a free enterprise economy. Though not perfect, it ". . .still remains the effective mechanism for allocating the great bulk of resources in a modern economy."[19] Because

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[19] Johnson, Forward Prices, op. cit., p. 7.

of imperfections in the economy, including the agricultural segment, Johnson arrives at two conclusions. First, the price system will not achieve the theoretical optimum of resource use and second some action is required to improve, through the price system, resource allocation.

The price problem for agriculture is threefold. First, the high degree of instability in the general price level seriously limits the possibility of the best attainable resource allocation. Second, short-run cyclical fluctuations in the rest of the economy prevent resource owners from transferring their resources to superior employment opportunities. And third, unpredictable movements of both the general level of prices and commodity prices create a significant degree of uncertainty[20] in production planning. In view of the fact that Johnson addresses himself primarily to this third problem, it will be considered at greater length.

Uncertainty effects the decision making process of the farm firm in two ways. The first of those is in the formulation of the goals of the enterprise. Considerations of "safety" may become of equal or greater importance than goals of profit maximization. The farmer may well forego the possibility of high profit situations which are uncertain in favor of programs offering neither the possibility of high profit nor loss in the desire for long-run survival of the farm firm.

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[20] In Johnson's analysis uncertainty includes all circumstances in which decisions must be made without perfect knowledge of significant future events. Johnson's definition does not make a distinction between risk and uncertainty and therefore includes "measurable uncertainty", i.e. insurable uncertainty, which Knight would call risk. See F. H. Knight, Risk, Uncertainty and Profit (New York: Houghton Mifflin Co., 1921), especially pp. 20 and 225-232.

Secondly, uncertainty affects the choices of products, factors, production method and scale of plant. Uncertainty arises in several areas. The production function is not totally known, this arises from natural uncertainty, i.e. acts of God, drougths, floods, etc. Product prices are extremely volatile and uncertain. The length of the farm production cycle adds further to uncertainty. The farmer then not only is uncertain as to how much he will produce on the basis of given intentions but also as to what he will receive for his efforts. Uncertainty also leads to restrictions on capital availability. The lenders of funds react in two ways, by limiting the funds made available and by limited permitted uses of the funds. This last problem Johnson calls capital rationing.

The farm entrepreneur reacts in a number of ways to uncertainty:

(a) Diversification.--Given output and price uncertainty the firm reacts by producing more than one product. "Variations in the aggregate value of several products will be less than the average variation for each product taken separately."[21] Inefficiency arises because if the already small scale plant of the firm is further divided the result will in all likelihood result in higher costs.[22]

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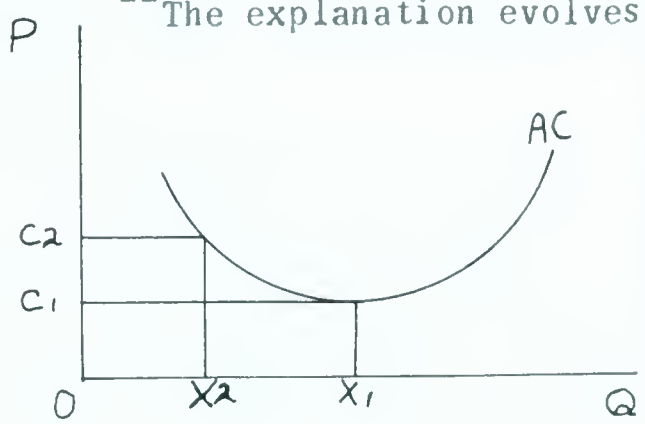
[21] Johnson, Forward Prices, op. cit., p. 48.

[22] The explanation evolves around the economics of scale. If it is assumed that the AC curve represents farm costs for producing X and that X_1 is output if all farm resources are employed, then a decision to produce more than one product and therefore less of X say amount X_2, causes unit costs to rise from C_1 to C_2.



(b) Flexibility.--If the farmer constructs his plant for cost minimization at a given average output, then any variation away from an average crop would cause sharply rising costs. In view of output uncertainty the farmer is prepared to give up the most efficient cost minimizing plant in an effort to withstand unforeseen changes. To the extent that this reaction contributes to inefficient resource use, social costs arise.

(c) Liquidity.--A third reaction is to hold a higher proportion of the assets of the firm in liquid form to offset unforeseen changes. This farmer reaction to limiting investment, added to the reticence of external lenders to loan to farmers, makes it difficult for the firm to obtain capital for long-term investment.

(d) Risk aversion and Capital Rationing.--The farmer, in a situation of uncertainty, will tend to use that combination of resources involving the least risk in the long run. The relative certainty of the supply of farm labor provided by the family leads to greater use of labor at the expense of more efficient capital investments. This factor Johnson considers of major importance in explaining the large labor force in agriculture. Long-run certainty would enable the farm unit to plan long-term investment in a more efficient manner.

The uncertainty of the farmer's surroundings leads the operator to choose safety over profit maximization and this leads to inefficient resource use. This problem of price uncertainty then is Johnson's main concern.

Johnson's goals of agricultural policy are six in number. The first two are resource goals.

(1) The maximum national product is derived when all resources are used to their maximum efficiency. The goal of optimum resource allocation is set for policy.

(2) Policy should make provision for economic growth and progress.

For the income goals Johnson is quoted directly:

(3) A minimum level of living based on social welfare criteria should be provided for all.

(4) Gross inequalities in income distribution should be mitigated.

(5) Any particular economic group should receive a per capita income which is on a par with other comparable groups in society.

(6) The distribution of income in time should be reasonably stable or changing at a fairly constant rate.[23]

Of the six goals listed above only the first is of major consequence in Johnson's subsequent analysis. For this reason the discussion of goals is not expanded at this stage.[24] With the price problem of agriculture now set out and the goals outlined, Johnson's analytical model is considered.

B. Analysis Used

The analysis used is essentially Marshallian. Its simplicity is striking. The resource allocation problem exists within agriculture, both within the firm and between firms, and between agriculture and the rest of the economy.

Assuming resource mobility, perfect knowledge and a competitive society, then a framework can be constructed in which the uncertainty problem can be analyzed.

Given certainty, the profit maximizing employment of resources for the firm would be to equate the value of marginal product to the

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[23] Ibid., pp. 19-20.

[24] It is clear that these goals are almost identical to the goals outlined by Pigou. See A. C. Pigou, The Economics of Welfare, 4th ed., (London: Macmillan & Co. Ltd., 1960), esp. Part I.

price of the factor and to determine outputequating marginal cost to marginal revenue. These equalities give the optimum position for the firm. Between firms within agriculture, resources would be used where the value of marginal product is equal to the marginal opportunity cost. If resources are mobile and their owners knowledgeable, optimum resource allocation results when all resources have achieved this equality. The criterion for optimum resource allocation between agriculture and the rest of the economy is the same as above. Factors of production must move to the uses of highest return.

Optimum social welfare is achieved when three simple conditions are met. First, the value of marginal product is equal to the price of the factor, second the value of marginal product is equal to the marginal opportunity cost of the factor in its best alternative use and third that the consumer is free to seek maximization of satisfaction. "These three conditions specify the required equilibrium position for a firm, for a factor and for a consumer."[25] To the extent that uncertainty prevents the achievement of these equalities, it contributes to the two basic problems of economics, namely, less than optimum resource use and less than maximum output for given use of resources. To these problems Johnson applies his program of forward prices.

C. Policy advocated

Johnson's policy proposals have three constituent parts. The most important part is forward prices, "the basic purpose of a forward price

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[25] Johnson, Forward Prices, op. cit., p. 24.

system is to reduce and/or transfer the amount of price uncertainty confronting farmers."[26] The basic characteristics of forward pricing have been outlined previously.[27] To repeat in summary, a forward price system involves estimation and announcement by a central agency of anticipated equilibrium prices at least one production period in advance and "a direct offer on the part of the government to assure farmers of receiving the anticipated prices or some major fraction of them."[28]

The determination of the announced prices by the central agency on the basis of long-run supply would increase the likelihood of "right" prices being used by farmers as a guide to production plans. This reduction of uncertainty would improve the efficiency of resource use. The actual means of determining the "right" prices by the central agency is a problem Johnson largely ignores, a question to be considered later.

The second step in Johnson's plan is a storage program. Once the forward price has been determined some effort must be made to assure the approximation of the announced price. A supplementary, though necessary, program of storage is added to the policy. Its contribution is to stabilize the flow of product into the market place and thus stabilize consumption over time. If the storage agency could even out variations in supply by purchase and sales activities, then a more constant supply with relatively stable demand would reduce price fluctuations in the market. In particular reference to a program of forward prices, a rationally operated storage

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[26] Ibid., p. 132.

[27] See above, Chapter Two, pp. 17, 18.

[28] Ibid., p. 132.

program would assist in achieving the announced prices.[29]

These first two parts of the program would contribute to the reduction of short-run instability of price and the resultant uncertainty facing the farm firm. But the long-run problem of uncertainty is not solved by forward prices announced for only one production period in advance. The third part of his program is introduced to protect ". . .farm income in the aggregate from the unpredictable changes arising out of fluctuations in the general price levels associated with levels of employment and production in the economy as a whole."[30] To Johnson the ultimate solution of this problem is an attack on the business cycle by "appropriate" fiscal and monetary policies, but until the cycle problem is solved a second line of defense is necessary for agriculture.

The Johnson proposal is simple in theory but may be difficult to implement. If a depression sets in, advance price guarantees would come into effect to yield farmers at least 75% of pre-depression income. The payments would begin when the level of unemployment in the economy had been above 6-7% of the labor force for a period of six months. The payments would stop when unemployment remained below the 6-7% for the same period. Payments would be based on previous levels of farm production and prices determined by the average price of each commodity in pre-depression years. In addition, some minimum level of payment would be

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[29] This discussion purposely does not deal with Johnson's theory of storage for two reasons. First, it is not essential to these purposes, and secondly, because Johnson's assumptions are suggested to be so unrealistic that the theory is of questionable value. See G. Mehren,"Review, Forward Prices for Agriculture," Journal of Farm Economics, XXX (February, 1948, 169-173.

[30] Johnson, Forward Prices, op. cit., p. 205.

established for each production unit. It could be termed a sort of minimum farm family allowance. Such payments would be made directly and would be consistent with the forward pricing scheme.

The Johnson program then consists of forward prices, a storage program to stabilize product flow and a depression income support program to reduce long-run uncertainty. The most characteristic feature of the whole policy is the faith placed in a modified free price system. That the program will not solve all of agriculture's woes Johnson admits, but an analysis of its possible effectiveness is deferred until Chapter 5.

IV. Recent Writings on Forward Pricing

The one remaining task in this chapter is to review the writings of Professor Johnson since Forward Prices exploring any further ideas he may have published. Only on two occasions in the literature does Johnson refer at length to forward prices. The first is a defence[31] of his approach to the agricultural problem by using the "ideal" resource allocation as a policy guide. If efficient resource allocation is desired, then the approach used in Forward Prices is correct. If, says Johnson, this is not the goal then his analysis is merely an economic exercise. The second reference is in Johnson's book, Trade and Agriculture[32] where forward prices are advocated as a part of a farm price and income program. In each of these cases Johnson appears convinced that his program of forward prices still has merit.

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[31] D. Gale Johnson, "A Note on Resource Efficiency and Policy," Journal of Farm Economics, XXXII (February, 1950), 123-128.

[32] D. Gale Johnson, Trade and Agriculture (New York: Wiley and Sons, 1950), esp. Chap. 7.

It is apparent from Forward Prices that Professor Johnson is concerned primarily with disparities of income between agriculture and the rest of the economy. His faith in the price system led him to advocate the reduction of uncertainty through forward prices to improve the efficiency of resource use. It was also one of the conclusions of Forward Prices that uncertainty and other factors caused an excess of labor to be involved in agriculture. It is not surprising then that the great bulk of Johnson's publications since 1947 have been concerned with improving labor mobility.[33]

Johnson's other writings have been on a variety of subjects and only one other publication[34] dealing with resource allocation will be discussed. In this article Johnson appraises the effects of American Farm Policy on resource allocation. A slight alteration in position appears here. Johnson rather than attacking the Farm Program as totally bad, has said

> . . . I have tried to indicate that in some broad overall sense the general efficiency with which agricultural resources have been used has not diminished in the past quarter century and has probably changed in a favorable fashion. It has been stated--though certainly not proven--that the existence of price supports even where not effective, has encouraged greater technological change than would have otherwise occured.[35]

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[33] D. Gale Johnson, "Allocation of Agricultural Income," Journal of Farm Economics, XXX (November, 1948), 724-749; idem, "The Functioning of the Labor Market," Journal of Farm Economics, XXXIII (February, 1951), 75-87; idem, "Procedures to Facilitate Shifts in Man Power," Journal of Farm Economics, XXXIII (November, 1951), 722-729; idem, "Output and Income Effects of Reducing the Farm Labor Force," Journal of Farm Economics, XLII, (November, 1960), 779-797; idem, "Labor Mobility and Agricultural Adjustment," in E. O. Heady et al. (Eds.), Agricultural Adjustment Problems in a Growing Economy (Ames: Iowa State College Press, 1958) pp. 163-173; idem, "Economics of Agriculture," in Haley (Ed.), A Survey of Contemporary Economics Vol. II, op. cit., pp. 223-256.

[34] D. Gale Johnson, "Competition in Agriculture: Fact or Fiction," American Economic Review, XLIV (May, 1954), 107-115.

[35] Ibid., p. 112.

However, two paragraphs later Johnson returns to his former position:

> Even so, price support programs have had influences on resource efficiency that have been undesirable.[36]

Despite the apparent softening in the Johnson position, his writings show a consistency of thought over time. Two basic characteristics stand out. The contention that the basic problems of agriculture are involved in resource mobility and allocation and second, the continued faith in the price system as the best allocator and organizer of the economy.

The theoretical considerations of forward pricing largely ended with Forward Prices. However, the policy of forward pricing as a part of an overall agricultural policy still recurs in the literature. For example, Schultz, Shepherd and Schickele, to mention only a few, have included forward prices in policies advocated at various times.[37] This incomplete list suggests the continued popularity of the idea, and also indicates that the policy is no longer considered as a complete policy. The question as to why forward pricing has never been fully implemented looms large at this stage. However, a discussion of this question will be deferred to later chapters, where the intent is critical rather than descriptive.

V. Summary

The concern of this chapter has been to outline in some detail the

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[36] Ibid., p. 113.

[37] See T. W. Schultz, Agriculture in an Unstable Economy (New York: McGraw-Hill, 1945), esp. Chap. 12; also T. W. Schultz, Production and Welfare of Agriculture (New York: Macmillan Company, 1949), note that on p. 160 dismisses forward prices as a politically acceptable policy; G. S. Shepherd, Agricultural Price Policy (Ames: Iowa State University Press, 1947) esp. Chaps. 19, 20, 21, 22 and 23; Rainer Schickele, Agricultural Policy (New York: McGraw-Hill, 1954) esp. Chap. 17. Also see W. M. Drummond and W. Mackenzie, Progress and Prospects of Canadian Agriculture (Ottawa: Queens Printer, 1957), Chap. 14.

evolution of the idea of forward pricing with special reference to the work of D. Gale Johnson. It has been shown that forward pricing developed in theory primarily in the 1940's. The proposals of announced prices before the beginning of the farm production period have been academically popular but never implemented in the practical case. This completes discussion of the development of forward prices in the United States for the time being.

CHAPTER 3

AGGREGATE SUPPLY CONTROL

I. Introduction

The concept of controlling total agricultural output is of a more recent period than that of forward pricing reviewed in the previous chapter. The approach involves the setting up of a "giant public utility" to adjust the aggregate supply of agricultural products to aggregate demand thereby yielding producers a "fair" price. Recognizing that aggregate demand for food is highly inelastic and relatively stable, the adjustment of supply to demand to yield a "fair" price seems to some to be the necessary approach.

The most frequent exponent of aggregate supply control is Willard W. Cochrane. Cochrane's major work, Farm Prices: Myth and Reality,[1] contains the essentials of the aggregate supply proposals. The major concern of this Chapter will be to review this work.

The approach to this price policy will be different than that used in the preceding chapter. Cochrane's book was published in 1958, prior to which he had published a number of articles. This factor dictates a different approach. After stating in a concise form the essence of the proposal

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[1] Cochrane, Farm Prices: Myth and Reality, op. cit., herein after referred to as Myth and Reality.

we shall review Myth and Reality in detail under the following headings; 1. Problems recognized and goals sought; 2. Analysis used; and 3. Policy derived. Under each of these headings reference will be made explicitly to the apparent precursors of Myth and Reality in Cochrane's earlier writings. In this way, it is possible to form an historical background for the policy of aggregate supply control. Finally consideration will be given writings on aggregate supply control since the idea was first expounded, with special reference to Professor Cochrane's recent writings.

One final clarification must be made before proceeding with the task of the chapter. Attempts at the control of production of individual farm products, directly and indirectly, have been made from time to time in various countries. The Soil Bank program of the United States, quantitative limits on production in order to qualify for support as contained in some legislation in Canada and the United States, as well as programs of fluid milk control, are examples of this approach. However, the concern is with total supply control rather than partial control.[2] This chapter will not include consideration of these policies dealing with input restriction or isolated commodities. Similarly, consideration of the "supply management" policy of the present United States Administration, which appears to embody Cochrane's ideas to a large extent, will be deferred to Chapter 5.

II. The Concept of Aggregate Supply Control

The concept of aggregate supply control can be best explained using aggregate supply and demand analysis. Two components are needed. First,

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[2] W. W. Cochrane, "An Appraisal of Recent Changes in Agricultural Programs in the United States," Journal of Farm Economics, XXXIX (May, 1957), 294.

an aggregate demand function for food which is highly price inelastic. Second an aggregate supply function of agricultural products which is also price inelastic. These functions together provide the foundations of the model. Given the price inelasticity of the supply and demand functions, it follows that slight shifts in either of the functions would result in rather severe price fluctuations. The demand function is either stable or slowly shifting over time. The significant shift factor is said to be population growth. The supply function is subject to two main shift variables, weather changes and technology. For the advocates of supply control the factor of technological advance is the vital one.[3]

The farm operator must accept price as given, therefore he will continually seek technological innovations to reduce costs and increase profitability. But the process of innovation is not smooth, also there are lags between the implementation of an improvement and the output results which varies from commodity to commodity. The farmer seeks innovations which will improve profitability, but innovations are by definition output increasing, if a constant body of resources, in particular labor and land, remains. As a result, the aggregate supply curve drifts to the right causing a fall in price, if demand remains relatively constant. Taking the new lower price as given, the farmer again seeks a new innovation to lower costs which in turn increases supply, and depresses price. The farmer then is running on a treadmill.

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[3] See W. W. Cochrane, "Professor Schultz Discovers the Weather," Journal of Farm Economics XXXV (May, 1953), 280-283; also T. W. Schultz, The Economic Organization of Agriculture (New York: McGraw-Hill, 1953) presents the initial case for weather.

Supply will always tend to outrun demand and cause a persistently low farm price level. When demand is price inelastic, lower price yields lower aggregate gross farm income. When resources are immobile lower gross farm income reduces returns per unit of resource.

The control of aggregate output in such a way as to achieve a "desirable" level of income is the postulated solution. The course of action dictates ". . . pursuing a policy in which entry into agricultural production is restricted and supplies are adjusted to demand, commodity by commodity, year after year to yield reasonably good and stable prices and incomes."[4] The mechanism to achieve this entails considering agriculture as ". . . a giant public utility composed of many, many small producing units acting in concert with the aid and consent of government to produce the quantities of food and fibre required by consumers, at a fair return to the producers involved."[5] The details of the program will be considered later.

The essence of the program is that the inelastic supply curve will chronically drift to the right because of technological innovation. The policy is to adjust, by a system of quotas, aggregate agricultural output to aggregate demand to achieve a fair and stable income for agriculture.

III. Review of Farm Prices: Myth and Reality

The intent in this section will be to review Willard Cochrane's major work. The approach will be different from the one used in the previous chapter dealing with forward prices since no historical body of literature

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[4] Cochrane, Myth and Reality, op. cit., p. 165.

[5] Ibid., p. 171.

exists on the proposal for aggregate supply control. Reference will be made to Cochrane's earlier writings where matters of goals, analysis and policy are discussed. The intent is to trace the development of Cochrane's thought which led him to advocate aggregate supply control.

Specifically the chapter will deal with the problems of agriculture recognized and the implied goals of policy outlined, with primary emphasis on Myth and Reality. In a similar manner the analysis used and the policies advocated will be dealt with.

A. Problems Recognized and Goals Sought

1. The Agricultural Problem.--Price variability is the major cause of agriculture's problem. There are two different types of price variability, the cyclical swings or variations in the general farm price level, which are unpredictable and do not necessarily coincide with changes in the non-farm price level, and the ". . .year-to-year variations in commodity prices around the moving farm price level."[6] The existence of price variability creates two economic problems for agriculture.

Variations in the farm price level leads to an income problem for agriculture. This problem is exemplified by the yearly changes in per capita farm income which exceed the variation in non-farm incomes. In addition, no immutable relationship appears to exist between farm and non-farm incomes. As an example Cochrane discusses the decline in per capita farm incomes in the United States in the period 1949 to 1957 while non-farm incomes have risen. Third, farm incomes are generally lower than the income received by similar non-farm groups. The income problem, then, is one of extreme

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[6] Ibid., p. 15.

variability and of a lower level of incomes in the agricultural sector. But the extreme variations in the farm price level also have consequences for society generally. The amplitude of the swings in the farm price level are greater than the amplitude of the swings in the general price level. In the upswings consumers suffer because of high food prices and short supplies, while all farmers, the efficient and the inefficient, make profits. On the down swing all farmers, regardless of their efficiency, suffer. Erratic swings in the farm price level have undesirable consequences for society and especially the agricultural sector.

The second problem is one of uncertainty. This results from extreme variability of commodity prices around the moving farm price level. This problem manifests itself in a less than optimum allocation of resources within the farm firm, between firms in agriculture and between agriculture and the rest of the economy. While the uncertainty problem is not so evident as the income problem, its effects are equally important to society.

The uncertainty problem contributes to a less than optimum use of resources ". . . over time in the production of a single commodity."[7] Uncertainty prevents the consumer's desires from being transmitted via the price system to the producer. Secondly, uncertainty prevents the most desirable (optimum) pattern of resource use in the production of all commodities within agriculture. The farmer must rely on his best guess or expectation of price. If these expected prices are not correct, surpluses and/or shortages could occur in agriculture again preventing the public from achieving maximum satisfaction. Confronted with this uncertainty the farmer may

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[7] Ibid., p. 25, italics in original.

seek through diversification to disperse the risks among various enterprises. If this diversification is uneconomic, in the face of price uncertainty, then a less than optimum resource allocation occurs. The existence of uncertainty in commodity and general farm price levels contributes directly to a lower and more variable income for agriculture. In addition, it is implicit in Myth and Reality that this variability contributes to a less than maximum possible social welfare for society as a whole.

Cochrane's concern with price changes and the responses of farmers dominates his earlier writings.[8] But the main intent of the cited articles was to explain the reasons for the swings rather than to discuss their implications for policy. This pattern we will see recur again in our discussion of the economic analysis used by Cochrane. Cochrane first sought empirical relationships existing in the economy and only in later writings did he begin to draw policy conclusions.

In summary then Cochrane concludes that the problems of agriculture are two; 1. an income instability problem resulting from variations in the farm price level and 2. a problem of lower income for agriculture arising from inefficient resource allocation as a result of commodity price instability and variability. Both of these problems are the normal rather than abnormal case for agriculture. Cochrane explicitly recognizes the same

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[8] See W. W. Cochrane, "Farm Price Gyrations: An Aggregative Hypothesis," Journal of Farm Economics, XXIX (May, 1947), 383-408; idem, An Analysis of Farm Price Behavior, Agricultural Experiment Station, Pennsylvania State College Progress Report 50, May, 1951; W. W. Cochrane and W. T. Butz, "Output Responses of Farm Firms," Journal of Farm Economics, XXXIII (Nov,, 1951), 445-469; W. W. Cochrane and H. C. Lampe, "The Nature of the Race Between Food Supplies and Demand in the United States," Journal of Farm Economics, XXXV (May, 1953), 203-222; and W. W. Cochrane, "Conceptualizing the Supply Relation in Agriculture," Journal of Farm Economics, XXXVII (December, 1955), 1161-1176.

problems that Johnson was concerned with in the previous chapter.

2. Goals of Policy.--We must distil Cochrane's apparent goals of policy out of his discussion of policy making and personal values. Before doing this, we must look at Cochrane's concept of the economist as a policy maker. Cochrane believes that economists must be prepared to make value judgements and advise in policy matters. In arriving at this conclusion Cochrane fights the ghost of Lionel Robbins[9] and modern welfare analysis. Economists who abide by this Robbinsonian tradition must of necessity be preoccupied with resource allocation, but contends Cochrane, ". . . this logic leads economists to positions of social sterility, to the empty conclusion of modern welfare economics that 'welfare increases whenever one or more individuals become more satisfied without any other individuals becoming less satisfied'."[10] The economists' participation in policy making occurs in two ways; first, in tracing out the economic consequences of a proposed course of action and second, by pointing out the socio-economic effects of a certain course of action. For Cochrane[11] the goals of policy must be separated from the economic analysis underlying the policy. Any policy decision taken to solve an economic ill will inevitably have consequences outside the defined sphere of economics. The economist then is taking ". . .a myopic view in discussing price and income policy for

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[9] Lionel Robbins, An Essay on the Nature and Significance of Economic Science (London: Macmillan Co., 1932). This is the classical treatise on the inappropriateness of value judgements in economics.

[10] Cochrane, Myth and Reality, op. cit., p. 120, quotation within from M. W. Reder, Studies in the Theories of Welfare Economics (New York: Columbia University Press, 1947), p. 14.

[11] See W. W. Cochrane, "A Theoretical Scaffolding of Price Policies," Journal of Farm Economics, XXXV (February, 1953), esp. 5-7 for a fuller discussion.

agriculture. . . ."[12] when he uses primarily economic efficiency principles and refuses to consider non-economic considerations. Therefore a policy is a compromise between conflicting interests. Economic efficiency may well be sacrificed to a degree to achieve other goals held socially desirable. The test of the validity of an economic policy, in Cochrane's terms, is not one of its conformity to economic principles alone. This background is vitally important for future discussions when we deal with Cochrane's specific policy.

In the outline of specific goals to follow it must be made clear that we have derived them from various portions of Myth and Reality. Goals as such are not explicitly stated, but can be fairly stated as the following;

1. A policy must be equitable to all parties as far as is possible. This goal evolves around the social responsibilities of the individual and society.

2. A high and rising material level of living for all. This goal presumably is an efficiency goal but it must be modified by other social considerations, such as

3. The maintenance of at least the present income distribution in the United States and preferably a reduction in the inequities of income distribution and

4. The maintenance of the family farm as the desirable socio-economic unit in agriculture.

In specific terms for agriculture we can define Cochrane's goals as

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[12] Cochrane, Myth and Reality, op. cit., p. 165.

the equality of income for farmers vis-a-vis the rest of the economy and the reduction of the variability of that income. Or as Cochrane puts it, a policy ". . . to yield reasonably good and stable prices and incomes. . ."[13] for agriculture.

In summary then Cochrane emphasizes the goal of equitable income distribution far more heavily than the resource allocation problem. It is here that the first major difference between Cochrane and Johnson arises. Whereas the forward pricing approach emphasizes the efficiency of the allocation of resources almost to the exclusion of the income problem, the aggregate supply approach is primarily directed at the income problem. Consideration will now be focused on the analysis used and the specific policy of supply control.

B. Analysis Used

The first task will be to construct Cochrane's model. After doing this we will note changes in the model over time. We begin by sketching, as briefly as possible, Cochrane's reasoning and analysis.

The agricultural sector of the economy is peculiar. While significant substitution of resources occurs between firms within agriculture, few resources seem to flow from agriculture to the rest of the economy. This is reasoned on the grounds of the fixity of agricultural resources and the lack of alternative opportunities for these resources in other sectors of the economy. For example, a self-propelled combine has little use outside of agriculture. Cochrane concludes that it is logical and correct to consider agricultural output in aggregate. Similarly, while the consumer

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[13] Ibid., p. 185.

may substitute one food item for another, there is little substitution between food and non-food items. Thus, when Cochrane considers agriculture in the aggregate he is ". . . relating over all demand to total product of the water tight compartment (agriculture)."[14] The lack of alternative uses for both agricultural resources and products has strong implications for the aggregate supply of and aggregate demand for agricultural products. Both of these functions tend to be highly inelastic.

The aggregate demand function for food describes the total amount of food that all consumers are willing to take at various price levels, other things equal. Cochrane argues that the nature of people's tastes for food makes the consumer unresponsive in quantity terms to changes in price. In other words, the aggregate demand function is highly inelastic. This price inelasticity, says Cochrane, is well known and empirically documented.[15] "It is this severe inelasticity of demand that forces farm prices to fluctuate in the extreme, and in turn creates a general income problem for agriculture."[16] Given this inelastic demand function we must know what causes it to shift. In high income nations, the income elasticity of demand for food tends to be low and declining as incomes rise further. While in the earlier stages of economic development rising per capita incomes had an expanding influence on the aggregate demand for food, in present day United States this factor is of minor importance. The major cause of demand expansion is population growth. This factor is given the dominant role in

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[14] Cochrane, "Farm Price Gyration; . . .," op. cit., p. 385.

[15] Cochrane, Myth and Reality, op. cit., esp. pp. 37-40; Also see Cochrane and Lampe, "The Nature of the Race. . .," op. cit.

[16] Cochrane, Myth and Reality, op. cit., p. 41.

Cochrane's work. One side of the model is complete, a severely inelastic aggregate demand function being shifted steadily to the right by population growth.

To complete the Cochrane model we must formulate an aggregate supply function.[17] This function, it is postulated, is highly inelastic and non-reversible for any period of time. The inelasticity results from the fixity of farm labor and the importance of fixed costs relative to variable costs in the farm firm. The irreversibility arises from the fixity of inputs once introduced to the firm. In other words, the alternative uses available to agricultural inputs are limited and yield low returns.[18] But Cochrane draws a distinction between the instantaneous supply schedule of traditional theory and the aggregate output curve for agriculture. The former is inappropriate for this analysis. Conceptually a schedule of intentions to produce is defined as ". . . the size of total product which in the aggregate producers will plan to produce at varying levels of price in any given year."[19] This schedule is a simple function of price and is postulated to be highly inelastic. But buyers in the market are interested in realized output rather than intentions. Thus to obtain a price solution realized

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[17] This section owes much to an excellent and more complete discussion of the aggregate supply function in Wm. Mackenzie, The Changing Cost Structure and Relative Profitability of Agriculture in the Regions of Canada, 1926-1956 (Unpublished Doctoral Thesis submitted to the University of Oxford, October, 1961); also see Glenn L. Johnson, "The Supply Function, Some Facts and Notions," in Heady et al. (Eds.) Agricultural Adjustment Problems in a Growing Economy (Ames: Iowa State College Press, 1958), pp. 74-94.

[18] See Cochrane, "Conceptualizing the Supply Relation in Agriculture," op. cit.; Cochrane, Myth and Reality, op. cit., pp. 50-51; also see Clark Edwards, "Resource Fixity and Farm Organization," Journal of Farm Economics, XLI (November, 1959), 747-759.

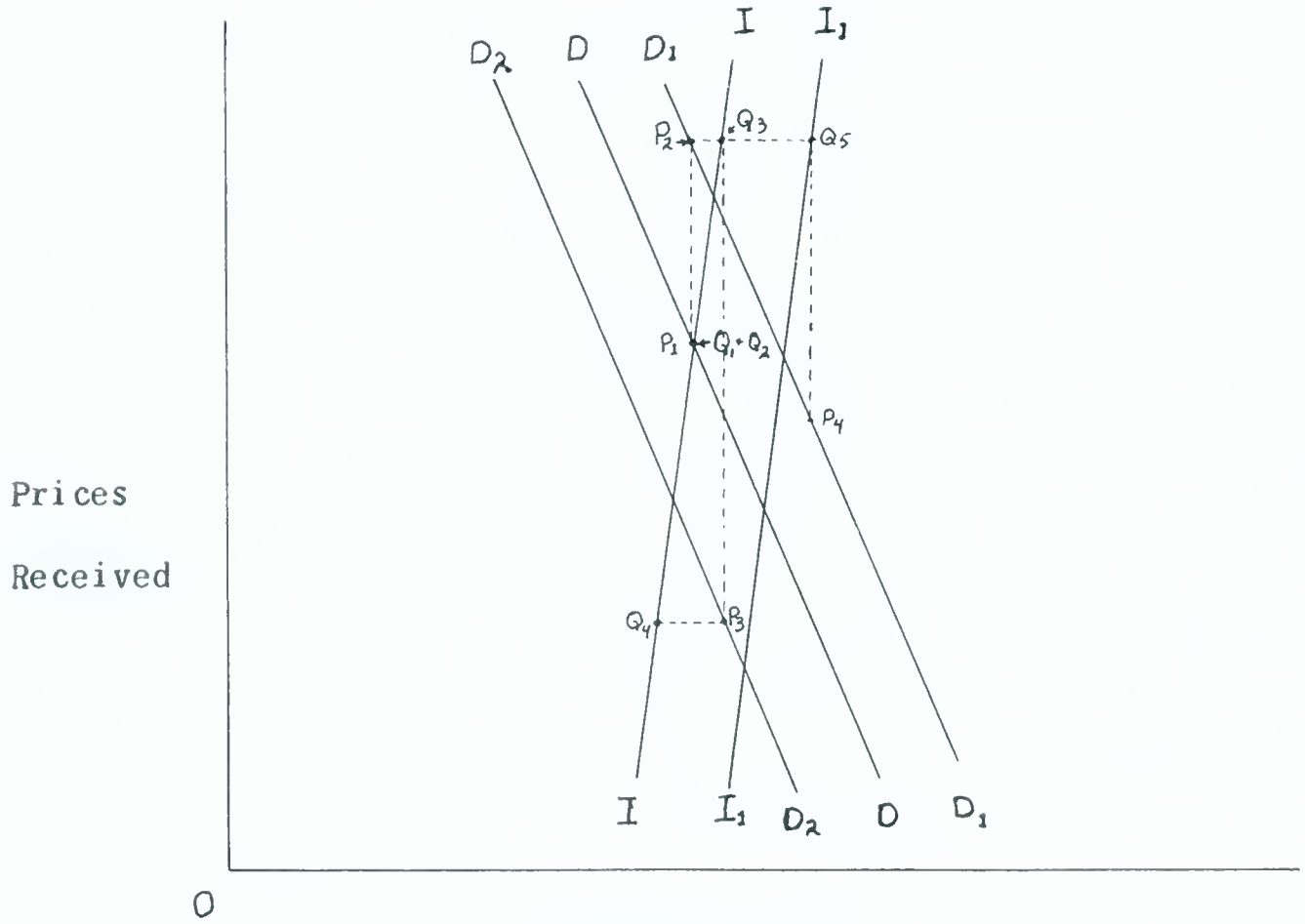
[19] Cochrane, "Farm Price Gyrations," op. cit., p. 384.

output must be set against aggregate demand. To achieve this price solution we must utilize a cobweb type of analysis.[20]

In Figure 3.1 an inelastic aggregate demand function DD and a highly inelastic output or intentions to produce function II are postulated.

Figure 3.1

The Cobweb



Assume that intentions to produce and realized output coincide in year 1 (Q_1) and this coupled with demand DD yields price P_1. In year two P_1 induces intentions to produce Q_2, but in the interval of time between the planning and the realization of the output, per capita income or population

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[20] M. Ezekiel, "The Cobweb Theorem," Quarterly Journal of Economics, LII (February, 1938), 255-280.

rise expanding demand to D_1D_1. Therefore output Q_2 sells at price P_2. Price P_2 induces farmers to plan to produce output Q_3 and this is realized, but in the interval it is assumed that demand has contracted to D_2D_2. So output Q_3 sells at price P_3, thereby inducing farmers to plan output Q_4 and so the cycle may continue as long as the postulated demand changes occur.

But suppose also that in the period of expanding demand, an unused pool of technology exists. The rising prices produce a climate of favorable expectations which induces farmers to innovate the new technology. Innovation, which in most cases is output increasing, will shift the intentions to produce function to the right to say position I_1I_1 in crop year three. Now instead of price P_2 inducing output Q_3 it induces Q_5. If demand holds constant at D_1D_1 then output Q_5 sells for price P_4 and so a new cycle is initiated. If it is assumed that demand continues to expand, the aggregate output curve may continue to drift to the right. But once it has taken up a new position it may only move outwards, in future time periods, for reasons already given.

Only in the special case where the demand curve and the output curve move outward simultaneously and with equal magnitude will a stable price level over time result. But this is not likely to occur. Thus, ". . . the farm price level gyrates in an extreme fashion."[21]

Thus it can be seen that in some cases a change in demand can have a price effect, i.e. moving up and down a fixed output curve, or a quantity

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[21] Cochrane, An Analysis of Farm Price Behavior, op. cit., p. 6.

effect in the case of expanding supply, i.e. a shifting of the output curve to the right.

The Cochrane model is complete for the static case. In review it contains a highly inelastic aggregate demand function which is shifted to the right primarily by population growth and to a lesser extent by changing incomes, and a severely inelastic output function, which is irreversible, shifted primarily by technology. Thus small shifts in either of these functions cause violent price fluctuations. "The movement of the severely inelastic demand curve indirectly along (through the vehicle of a time sequence) an even more inelastic and fixed schedule of intentions to produce . . . determines (1) the price level at which total production of agriculture moves and (2) the total amount of product that will move,"[22]

The agricultural price level then is determined by the race between aggregate demand and aggregate supply. Throughout all of Cochrane's work this race is important,[23] particularly in Myth and Reality where the continual out distancing of demand by supply leads Cochrane to advocate aggregate supply control. But further investigations of the reasons postulated by Cochrane for supply shifts are necessary.

In Cochrane's earlier work demand shifts are the causative factor. American society places nigh emphasis on technology. In addition, agricul-

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[22] Cochrane, "Farm Price Gyrations," op. cit., p. 367.

[23] A brief historical note seems in order. The first major study of differential rates of growth of aggregate supply and demand was done by T. W. Schultz in Agriculture in an Unstable Economy, op. cit. In addition, an article by J. M. Brewster, "Farm Technological Advance and Total Population Growth," Journal of Farm Economics, XXVII (August, 1945), 504-525 concluded that the most important shifter of supply was technology and the major shifts in demand were caused by population growth. Cochrane obviously has been

tural research has been assumed by government agencies. These factors result in a constant outpouring of new technologies, which are by definition output increasing or cost reducing. Given an increase in demand, prices rise in the short run, a favorable climate for investment is created in addition, profits increase and funds for investment become more available so the farm entrepreneur undertakes innovation. This innovation shifts the output function and expands supply. In periods of stationary or declining demand, innovation is slower and a pool of unused technology builds up ready for use during the next period of rising prices.[24] The innovation process is halted when the accumulated pool of resources is exhausted. Increased demand then will have a price rather than a quantity effect. The dynamic effect of demand increases is the major stimulus to supply expansion in all of Cochrane's work up to and including the early chapters of Myth and Reality. "Rising farm prices and the expectation of continued rising prices can speed up the rate of farm technological advance, hence speed up the rate of aggregate output expansion, hence shift the aggregate supply relation."[25]

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influenced by these works and he in fact gives explicit credit to Schultz. In some of Cochrane's work this race is dominant, and the conclusion is drawn that unless abnormal circumstances arise agricultural supply will outrace demand. See esp. Cochrane and Lampe, "The Nature of the Race Between Food Supplies and Demand in the United States," op. cit.

[24] This is essentially a Schumpeteran argument of cyclical behavior. Cochrane gives Schumpeter credit for influencing his appraisal of agriculture. See Cochrane, An Analysis of Farm Price Behavior, op. cit.; also see Joseph A. Schumpeter, The Theory of Economic Development, (New York: Oxford University Press, 1961), esp. pp. 212-255.

[25] Cochrane, Myth and Reality, op. cit., p. 51.

But in Chapter 5 of Myth and Reality, "The Generalized Theory of the Agricultural Treadmill" is introduced to explain shifts in supply. In this theory supply expansion is self-generating and perpetuating. In other words, the output function drifts to the right regardless of the direction of the price level. "Rapid and widespread farm technological advance drives the aggregate supply relation ahead of the expanding aggregate demand relation in peace time; and given the highly inelastic demand for food, farm prices fall to low levels and stay there for long periods."[26]

The treadmill argument runs as follows. The individual takes price as given and he therefore seeks cost reducing methods to improve the profitability of the farm firm. Farmers are classified into three groups, the vanguard farmers, the average farmers and the laggard farmers. The first group is small but influential, the second group contains the majority of commercial farmers and the third group the marginal farmers. The vanguard farmer, seeking to increase profits, introduces a new technique which by definition produces more from a given body of resources. This increases output which, with costs remaining the same, increases profitability for the innovating firm. The average farmer, seeing that his neighbor has benefitted from technological innovation, follows suit. But the average farmer produces the majority of the output of agriculture. The aggregate supply is shifted to the right. Price falls, given stationary demand, and the vanguard farmer again seeks to increase profitability and so the vicious cycle starts around again. The farmer is running on an endless treadmill always defeating his own purpose. In the process the laggard farmer has his assets slowly eaten

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[26] Ibid., p. 107.

away. Aggregate supply will always drift outward and agriculture will be in a chronic state of imbalance.

In summary, it is found that the basic components of Cochrane's model have remained constant. The highly inelastic demand coupled with a severely inelastic and non-reversible output or intentions to produce function are the components. Shifts in one or the other cause large price variations and small quantity adjustments. But the factor initiating the shift of the output function has changed. In most of Cochrane's earlier work the causative factor is demand, shifted by population growth and to a lesser extent by changing per capita income. In other words, farmers are responsive to price rises if not to price declines. But in Myth and Reality the output function and thus aggregate supply drifts to the right simply because of the technological treadmill. Why does Cochrane retreat from the former explanation? This question will be considered in Chapter 4.

It would be unfair to conclude this section without mentioning that in most of Cochrane's publications he attempts to document empirically his explanations of farm price behaviour. These empirical studies will be considered later only as they relate to the critique of Cochrane's proposals. Attention is now turned to consider the policy Professor Cochrane advocates on the basis of the above conclusions.

C. Policy Advocated

The task in this section will be to outline the policy of aggregate supply control advocated by Professor Cochrane, in Myth and Reality. But before doing this it may be interesting and significant to review briefly earlier policies advocated by Cochrane. For it is found that the policy of aggregate supply control implies the replacement of market determined prices,

which presumably to some extent reflect scarcity and surplus, with prices determined by a Government agency using a desired level of income as the guiding factor. This relegation of the price mechanism to a minor role, is of only recent vintage in Cochrane's writing.

The Cochrane policy position in 1945 is established. To avoid the possibility of false interpretation Cochrane will be quoted extensively.

> With certain reservations and necessary adjuncts, . . . agricultural policy in the postwar period with respect to prices should be to permit each commodity price to seek its own level. . . . Specifically, this means that the Federal Government should discard the now current parity price formula, and make no further attempt at price-pegging or fixing when the Steagall and basic commodities commitment is fulfilled. . . . It is simply held that the pricing mechanism is so complex and so necessary to the rational use of resources that any tinkering with it is likely to lead to further maladjustments. . . . Further, on the basis of past experience it is clear that a central agency, charged with the responsibility of managing prices in a capitalistic society, would be so pressured by producers' groups for special concession that a rational management of prices would be impossible.[27]

Cochrane's proposals were two: (1) a food Discount plan for demand expansion[28] and (2) a program of adjustment to shift inefficient farmers out of agriculture. The price system, as is obvious from the above, was to remain free to achieve rational resource allocation.

In 1950, commenting on a proposal which would increase the activities of the United States Government in the agricultural sector, Cochrane states:

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[27] W. W. Cochrane, "A Price Policy for Agriculture Consistent with Economic Progress, That Will Promote Adequate and More Stable Income from Farming," Journal of Farm Economics, XXVII (November, 1945), 815-816.

[28] This probably follows logically from Cochrane's Ph. D. Thesis submitted to Harvard in 1945 (The Problem of Achieving a High Level Food Consumption in the United States).

> And this is what I want--an income support program for agriculture which does not interfere with the essential integrating role of prices. . . . I repeat, if you tinker with one price to enhance the incomes of the producers involved, you are driven to "adjust" the price of a second product and so on through the chain of substitutes in order to keep products moving.[29]

Again in 1953 Professor Cochrane extols the virtues of the price system. While now recognizing a serious income or equity problem in agriculture, Cochrane maintains that:

> The pricing system in this context has only one ultimate responsibility--namely to provide the signals required in directing resource use. To enhance the effectiveness of the price system in agriculture in this efficiency role, it is suggested that limits be placed on the extent to which prices may fall from one season to the next. This action introduces relative price certainty and contributes to the efficient planning of production.[30]

The income problem, says Cochrane, must be solved outside of the price system by a system of direct payments.[31]

However, the Cochrane position has shifted when aggregate supply is proposed. The basic tenets of the policy were first outlined[32] to the Meeting of the American Farm Economic Association in December, 1956. After reviewing the farm policy of the Federal Government, Cochrane con-

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[29] W. W. Cochrane, "The CCC Operations and Marketing," Journal of Farm Economics, XXXII (May, 1950), 956-957.

[30] Cochrane, "A Theoretical Scaffolding of Price Policies," op. cit., p. 14.

[31] Cochrane specifically refers to forward prices and dismisses them as inappropriate for two reasons; 1) because announced prices would differ from expected prices and lead to surplus and shortage problems, and 2) the political pressure on the price setting agency would prevent successful operation of the scheme. Ibid., p. 12.

[32] W. W. Cochrane, "An Appraisal of Recent Changes in Agricultural Programs in the United States," Journal of Farm Economics, XXXIX (May, 1957), 285-299.

cludes that government will never be able to withdraw from the agricultural sector, for these reasons; "(1) extremely low price and income elasticities for farm products; (2) the ubiquitous technological drive to increase output on 3 million commercial farms, and (3) the democratic ethic of reasonably fair incomes for all members of society."[33] Further, says Cochrane, the introduction of stability into the agricultural sector by Government support actions has in fact improved resource allocation rather than the reverse as charged by "orthodox" economists. The preferable program then is one which reduces the drain on the Federal Treasury of the present surplus producing farm programs while yielding an equitable income to farmers. These objectives are met by the principles of supply control program which he then outlines in skeleton form.

The approach involves four stages;

(1) Congress would determine fair prices which would act as guides in setting national sales quotas. In the setting of these prices, both the needs and interests of consumers and producers would be taken into consideration.

(2) The sales quotas set for the nation would be at such a level so as to clear the market at the predetermined "fair" prices. The quotas would vary from year to year and would apply to off farm sales only. (At this stage feed grains, feeder pigs and cattle are to be excluded.)

(3) Each farm unit would receive at the beginning of the program, a sales quota based on his past record of production. A percentage of the

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[33] Ibid., p. 288.

face value of the quota would be announced as permissive marketings in any given year. Sales over the quota would be illegal.

(4) The quotas or certificates would be negotiable, allowing for internal adjustment within agriculture. The cost of the quota would become a fixed cost of farming.[34]

Cochrane admits that there would be problems of operation. "But we will leave the details and the operational problems to the politicians and the administrators."[35]

The above four principles recur in all of Cochrane's work on supply control. The remainder of the concept will be dealt with without reference to the mechanics of operation of the program (See Chapter 5).[36] First to expand on the concept of "fair" price. Cochrane suggests the use of a "representative" firm for agriculture. This firm would be a statistical average farm under average management representative of American agriculture. The fair price would be based on a return to the farm labor input similar to off farm employment, say skilled workers in the construction trade. Similarly, a return on farm should be similar to ". . . the rate earned on capital invested in readily accessible nonfarm investment insti-

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[34] Cochrane indicates in a footnote that the approach he has used is similar to the one used in a paper by P. H. Stephens, entitled "Writing on the Wall," given before the 29th Annual Convention of the Colorado Wool Growers Association, Steamboat Springs, Colorado, July, 1956; quoted in Ibid., p. 297.

[35] Ibid., p. 298.

[36] Cochrane, Myth and Reality, op. cit.; and W. W. Cochrane, "Some Further Reflections on Supply Control," Journal of Farm Economics, XLI (November, 1959), 697-717. The remainder of this section will draw on these references without differentiation.

tutions--perhaps 4 to 6 percent."[37] These prices, so determined would be guides in determining national sales quotas.

The aggregate demand would be calculated by the summation of the various market demands; the domestic disappearance of the commodity, export trade moving in private channels at the "fair" prices, foreign trade moving under international trade agreements and the sale of commodities in established surplus disposal programs,[38] i.e. Public Law 480. The sum of these quantities would yield the required amount of commodities required in any given year.

Given demand and desired prices, supply would be adjusted by means of quotas, to achieve this price. Recognizing the variable nature of weather conditions, Cochrane suggests that a purchase-storage program would be necessary to achieve these prices. We must emphasize that supply control programs utilize the market to clear quantities produced. Agriculture is given monopoly power, through aggregate supply control, to restrict supply to achieve a predetermined price.

Leaving aside any discussion of the mechanics of supply control (which Cochrane says society will work out if the end is desirable), we

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[37] Ibid., p. 701.

[38] Cochrane argues that supply control and foreign surplus disposal are compatible. Cochrane says that, while Public Law 480 and other surplus programs were developed with the selfish motive of domestic surplus disposal in mind, experience has shown the value of the programs in economic development. Thus, he argues that these programs should be considered part of normal demand. See W. W. Cochrane, "Farm Technology, Foreign Surplus Disposal and Domestic Supply Control," Journal of Farm Economics, XLI (December, 1959), 885-899.

close this section with two further comments. First, throughout Cochrane's discussion emphasis is placed on controlling only those products which reach off farm markets. This excludes by definition the knotty problem of intermediate agricultural outputs (e.g. feed grain, feeder cattle, etc.). For example, if controls are placed on livestock output, not only do you have the problem of quality of the output, but more important what happens to the farm producing cash feed grains for sale to his neighbor. Or if feed grain output is controlled, how do you control the feed grain produced and fed on the same farm. For these problems Cochrane admits he has no clear-cut answer. Secondly, the intent of the policy of supply control is to provide an equitable income for agriculture without direct cost to the economy. Aggregate supply control does not solve the problem of inequitable income distribution within agriculture, but Cochrane contends that the program is not designed to achieve this purpose.

The brief discussion of aggregate supply control is finished.[39] In summary, for aggregate supply control ". . . the problem is that of achieving a rate of growth in farm output, commodity by commodity, equal to the rate of growth in demand, commodity by commodity."[40] The one remaining task in this Chapter is to review the literature that followed the proposal of supply control.

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[39] For an excellent statement of the concept of aggregate supply control in concise terms see, G. E. Brandow, "Supply Control: Ideas, Implications, and Measures," Journal of Farm Economics, XLII (December 1960), 1167-1180.

[40] Cochrane, "Some Further Reflections on Supply Control," op. cit., p. 704, (underlining supplied).

IV. Recent Writings on Supply Control

Cochrane's proposals, radical in nature, sparked a controversy in the literature of agricultural economics. Much of the literature is critical, some involved attempted measurement of aggregates used in Cochrane's work and some attempted to expand the concept. Due to space limitations and the intent of this chapter, it will only be concerned with the latter group.

Professor Cochrane has written little on the concept of supply control since writing the references referred to above, except to emphasize its importance in articles written on other subjects.[41] G. E. Brandow has written fairly extensively on supply control.[42] In a comprehensive empirical study[43] of the effects of aggregate supply control on farm income and the consumer price index, Brandow concludes that it is conceivable that a comprehensive supply control program could raise farm incomes by as much as one-third, while only raising the consumer price index by about one and one-half per cent. One other conclusion arrived at is of interest. Brandow, after empirical investigation, concludes that for supply control to be effective, it must control for all practical purposes all of agriculture. The program must include control of the livestock sector, which Cochrane had set aside, if excess resources from controlled commodities are not to expand uncontrolled commodity output. But, says Brandow, the likelihood of total control in the

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[41] In addition to articles previously cited, see W. W. Cochrane, "Discussion; Farm Political Power and the U. S. Governmental Crisis," Journal of Farm Economics, XL (December, 1958), 1659-1661.

[42] See Brandow, "Supply Control: Ideas, Implications, and Measures," op. cit.; also G. E. Brandow, Interrelations Among Demands for Farm Products, and Implications for Control of Market Supply, Bulletin 680, August, 1961. The Pennsylvania State University College of Agriculture, Agricultural Experiment Station, University Park, Pennsylvania.

[43] Ibid.

near future is unlikely. Therefore while the conceptual benefits of supply control are large, real problems may hinder the program's success.

The problem of the feed-livestock sector induced the only other concrete addition to the concept of supply control. Cochrane's sketchy proposals for this sector involved direct controls on livestock output rather than on feed grain inputs. Branson[44] argues that direct livestock controls are undesirable for three reasons; first the demand for and supply of livestock have higher elasticities than the reaminder of agriculture, therefore price adjustment has taken place to a greater extent in this sector than in others, second because of the fluidity of resources in the livestock sector, supply control would have undesirable affects on resource allocation and third, livestock producers are particularly resistant to controls of any nature. But, argues Branson, if supply control is to be effective all output must be controlled. The postulated solution is a combination of acreage and output controls on the production of feed inputs. Acreage control has been ineffective by itself, but if combined with output control the problem of excess production resulting from increased use of variable resource may be overcome. The details of this plan we pass by, noting that it is an effort to come to grips with the major conceptual difficulty involved in supply control.

V. Summary

The concern of this chapter has been to outline the evolution of the

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[44] R. E. Branson, "Supply Controls and Acreage Controls; A Proposed Synthesis," Journal of Farm Economics, XLIII (May, 1961), 278-285.

concept of aggregate supply control. It has been seen that the policy evolves primarily around the work of Professor Cochrane. The proposal rests on the assumption that agricultural inputs are not responsive to price changes. The constant flow of technology, being innovated by farmers, continually pushes supply ahead of demand yielding low farm prices and incomes. The solution as has been shown, is to adjust supply to demand, commodity by commodity, to produce a fair return to agricultural producers.

CHAPTER 4

A THEORETICAL EVALUATION OF THE SELECTED POLICIES

I. Introduction

It is desirable at this stage to restate the future course of this study. To date, the main concern of the paper has been descriptive and historical, outlining the concepts of forward prices and aggregate supply control. This provides a valuable background for what is to follow. This is so since the remaining task is to compare and criticize the two concepts in the hope that the relative merits (if any) of each may be distilled out and a policy approach for Canada suggested. Specifically, this chapter will deal with the nature of the agricultural problem as reflected in the policy goals contained in each approach. In addition, the extent to which each policy can be expected to meet all or part of these goals will be appraised.

As the preceding chapter has shown, there is general agreement concerning the broad nature of the agricultural problem. Also the goals for an agricultural policy will be found to be similar although the difference in emphasis placed on different goals will be noted. The major part of this chapter will be concerned with a theoretical evaluation of each of the concepts. As the analysis underlying forward prices is essentially micro-economic firm analysis, while that for supply control is aggregate analysis, the concepts must be treated separately.

Chapter 5 will be concerned with the operational limitations of the policy approaches for the Canadian setting. Finally given the theoretical and operational limitations of the policies, an indication of the probable effectiveness of each policy for Canada will be attempted. The concluding chapterswill integrate the previous chapter and recommend a possible direction for Canadian agricultural policy in accordance with the findings of this study.

II. The Concept of the Agricultural Problem

The analysis of the previous two chapters has shown that the concept of the agricultural problem held by the two schools of thought under review is very similar. Both Johnson as a major advocate of forward prices and Cochrane as a proponent of agricultural supply control, recognize two basic agricultural problems; the resource allocation or efficiency problem and the income problem (namely that of a lower and more variable level of income received by agricultural producers). The efficiency problem arises primarily from the extreme variability in commodity prices. This variability creates price uncertainties which cause the farmers to react by adopting various measures such as - diversification, increased flexibility, high liquidity and the choice of safety rather than profit maximization, in an effort to hedge against the uncertainty facing the farmer.

To the extent that these efforts result in a less than optimum usage of resources, inefficiency and reduced returns are present. The income problem results from the variability in the farm price level and its relation to the general price level in conjunction with output variability and costs of inputs. The business cycle is recognized as contributing to the

agricultural income problem, although Johnson places much more emphasis on the effects of the total economy on agriculture than does Cochrane. Both schools of thought then, recognize in large measure the same agricultural problem.

The goals of agricultural policy are also essentially the same, although the emphasis given by Cochrane and Johnson to the following goals is somewhat different. The resource goal is essentially the attainment of maximum national product from a given body of resources with provision for economic adjustment and growth. The income goals are the lessening of the inequality of individual income distribution in the total economy and the inequality between average per capita agricultural income and per capita income in the rest of the economy. The level of income should be sufficient to provide a minimum standard of living for agricultural people and be cyclically stable and demonstrating a rising secular trend. The policy approach of forward pricing is primarily concerned with the solution of the efficiency problem, while the concept of aggregate supply control is directed primarily at the income problems. The difference in emphasis can be explained to some extent by the conception of the role that prices must play in agricultural policy. For Johnson the role of market determined price, though somewhat guided, is essential to the solution of the agricultural efficiency problem. The problem of income instability is to be lessened in case of a depression by a direct income support program. For Cochrane the income problem is paramount. Through the manipulation of aggregate supply, the price system is to be used to solve the income problem, although concern is also expressed for the efficient allocation of resources. But for Cochrane, this is a secondary problem. The fact then that the policies are to some extent directed

at different parts of the agricultural problem must be continually borne in mind. The extent to which each of the concepts achieves the policy goals set out for it, and an evaluation of the effects on the remainder of the agricultural problem, will follow the discussion of the theoretical and practical implications of the two policies.

III. The Theoretical Attributes of the Policies

A. Forward Prices

The intent of this section is to question the validity of the theoretical analysis and conclusions of the policy of forward prices, as proposed by Professor Johnson. It will be worthwhile to begin by reviewing in summary form the engine of analysis used by Johnson in his discussion of forward pricing.

The optimum position for the firm and for the economy is expressed by three marginal equalities inherent in traditional micro-economic theory. Given the explicit assumptions of resource mobility without cost, of perfect knowledge and of pure competition, the maximum national product is achieved when; 1) The value of marginal product of each factor used is equal to factor price, yielding a maximum product from a given fund of resources. 2) The value of marginal product and the price of the factor are equal to the marginal opportunity cost of the factor, thus achieving the optimum use of resources by factor owners. 3) The consumer is rational and free to seek the maximization of satisfaction. In so far as inefficiency arising from price uncertainty prevents the realization of these equalities, less than an optimum national product will result. Forward prices are postulated as a partial solution directed at the closer approximation of the optimum conditions and therefore a higher national product.

The usage of the Marshallian equalities of micro-economic theory as a guide to policy is open to question on two grounds. First, there is the possibility of a divergence between marginal social net product and marginal private net product as developed by Pigou.[1]

Second, the theory of the second best questions the appropriateness of using marginal equalities as policy guides in a mixed economy, this notion being first developed by Meade[2] and later generalized by Lipsey and Lancaster.[3] Each will be dealt with in turn.

Pigou argued that it was only under very specific conditions that the self-interest of the individual would yield maximum private and social product simultaneously. If any of the following conditions existed in the economy, a diversion between private product and social product would occur, and therefore government intervention was justified. The conditions are: 1. The absence of perfectly competitive conditions in the economy, e.g. monopoly, monosopony, or monopolistic competition. 2. The existence of external economies or diseconomies of scale. 3. The existence of governmental or institutional interventions or rigidities in the market which prevent the competitive forces of the economy from achieving the equality of private and social costs and benefits, and 4. The existence of taxes and subsidies in the economy.[4]

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[1] A. C. Pigou, The Economics of Welfare, op. cit., esp. Chapter 9.

[2] J. E. Meade, Trade & Welfare (London: Oxford University Press, 1955), esp. Chapter 7.

[3] R. G. Lipsey and Kelvin Lancaster, "The General Theory of Second Best," Review of Economic Studies, XXIV (1956-57), 11-32.

[4] For an excellent treatment of these four cases see Meade, op. cit., pp. 13-26.

It is not the intent of this paper to enter into the discussion of the merits of Pigou's recommended policies to counteract the divergence between social and private net products. It is clear, however, that the four postulated causes of divergency exist to varying extents in any modern quasi-capitalistic economy. The result is that the usage of the marginal equalities as a policy guide is, to say the least, of questionable value.

Turning now to the theory of the second best, further questions have been raised. For the purposes of this discussion, it will be assumed that the Marshallian conditions for the optimum are for all practical purposes the same as the more numerous and precise Paretian optimum[5] conditions of the new welfare economists.[6] The achievement of the Paretian optimum involves the simultaneous fulfillment of the marginal equalities listed above. These yield optimum resource employment, consumer satisfaction and maximum national product, given the assumptions of pure and perfect competition. In other words, to achieve the optimum position of welfare where no person can be made better off without making someone else worse off, the purely competitive economy must be in complete equilibrium. Despite the fact that obvious divergences from competitive conditions exist in the economies of western nations, economists have continued to apply the marginal conditions as policy guides in sectoral analysis. That is, if in a sector of the economy, say agriculture, divergences

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[5]For an explicit listing of the Paretian conditions see Abram Bergson, "Socialist Economics," in Howard Ellis (Ed.), A Survey of Contemporary Economics Vol. I (Homewood, Ill.: Richard D. Irwin Inc., 1948), pp. 412-449 and K. Boulding, "Welfare Economics," in Bernard Haley (Ed.), A Survey of Contemporary Economics Vol. II, op. cit., pp. 1-34.

[6]Bergson, op. cit. and I.M.D. Little, A Critique of Welfare Economics, Rvd. ed. (London: Oxford University Press, 1947), pp. 130-131, argue that the Paretian conditions are less restrictive than the Marshallian conditions of the optimum.

between marginal value product and factor return, marginal cost and marginal revenue, etc. exist, a more desirable situation is achieved by the lessening by these divergences. It therefore follows that despite the existence of extensive defects in the competitive model of the economy generally, if a sector approaching competitive conditions (agriculture) is induced to a closer approximation of these marginal conditions, welfare is increased. This is the core of Johnson's case.

The general theory of second best is a generalization from particular, though isolated, studies pointing out that if one of the Paretian marginal conditions is violated, an optimum position may be achieved by the violation of all other conditions. The first exponent of this argument was Meade,[7] who argued the case that the individual nation may be made better off by the application of an optimum tariff in an otnerwise free trade world. Lipsey and Lancaster[8] argue generally that . . .

> if there is introduced into a general equilibrium system a constraint which prevents the attainment of one of the Paretian conditions, the other Paretian conditions, although still attainable, are, in general, no longer desirable. In other words, given that one of the Paretian optimum conditions cannot be fulfilled, then an optimum situation can be achieved only by departing from all the other Paretian conditions.[9]

Further. . .

> it is not true that a situation in which more, but not all, of the optimum conditions are fulfilled is necessary, or is even likely to be, superior to a situation in which fewer are fulfilled.[10]

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[7] Meade, op. cit.

[8] Op. cit.

[9] Ibid., p. 11.

[10] Ibid., p. 12.

For Johnson's analysis the implications of the above are obvious. It is not possible to say that the welfare of the society or especially of the sector will necessarily be increased if the forward prices were to improve the competitive conditions in agriculture, while leaving the rest of the economy imperfectly competitive. Lipsey and Lancaster in fact argue this case for the mixed economy, where one sector may be controlled (either by government or monopoly) and the other sector uncontrolled, i.e. (competitive). The second best suggests two solutions as being equally desirable, either the giving of power or control to the competitive sector or breaking down the control of the monopoly sector. But the solution is clearly not one of increasing the competitive nature of the uncontrolled sector while leaving the monopoly sector untouched.

Galbraith[11] had previously argued a similar proposition with special reference to agriculture. The argument in simple terms is this: modern capitalism naturally develops towards concentration of power, but there are some sectors, notably agriculture, consumers and labor, which do not exhibit an obvious trend in this direction. Galbraith argues that for years agriculture has sought to break down monopoly in the rest of the economy but without success. The solution postulated is for the government to give agriculture monopoly control so that counter balancing power would exist between the sectors of the economy. The terminology, countervailing power is coined to describe this phenomenon.

The above has skirted the vast field of welfare economics. Nothing

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[11] J. K. Galbraith, American Capitalism, The Concept of Countervailing Power, op. cit., esp. Chaps. 9 and 11.

has been argued as to the reality of the abstract Paretian optimum condition, nor will this be done. It is clear, however, that they are relevant to this discussion. The purpose has been purely one of questioning the validity of Professor Johnson basing his whole case for forward prices on the postulate that a movement of the agricultural sector towards more competitive conditions will necessarily increase the welfare of the nation. Therefore it can be fairly concluded that the theoretical basis for forward pricing is not invincible.

But what of the theoretical outcome of the policy itself. Forward prices implies that if some central agency assumes the responsibility for setting the "correct" prices, uncertainty will be reduced, resource use efficiency increased and welfare increased. Johnson's approach contains at least four implicit assumptions which must be investigated. First, the assumption that marginal analysis is applicable and practical, has been dealt with above. Second, that farmers are responsive to price change in their production planning. Third, the assumption that farmers will react to the "correct" prices in a manner consistent with the central agencies' prediction of price response. Fourth, that the central agency can predict consistently, prices over time with greater accuracy than the individual farmer. Assumptions two and three will be briefly discussed here, and discussion of assumption four will be deferred to the chapter dealing with the practical applicability of the policy. The issue of the responsiveness of farming to price changes has recurred through the literature of the past thirty years. It is generally agreed that in the aggregate, agriculture has demonstrated a high degree of unresponsiveness to price change. In other words, the price elasticity of aggre-

gate supply is highly inelastic, although the degree of this inelasticity is a point of contention. As the inelasticity of aggregate supply is a major premise in Cochrane's analysis, the discussion of the merits of this contention will be deferred to the next section. But even more important for Johnson's analysis is the price responsiveness of the individual farm firm.

The price elasticity of supply of individual agricultural products is generally recognized as being more elastic than the aggregate supply. This has been established by empirical analysis to be the case because of the inter-product transfers of resources within the farm unit or between the units in agriculture which can occur. For example, the Alberta farmer may alter his output from wheat to oats and oats to rapeseed without major alteration in factor usage especially the usage of capital equipment and land. The ease with which resources can shift from enterprise to enterprise is not the same in all cases. An alteration from milk to hog production may involve greater difficulties. Therefore it seems likely that the elasticity of supply of some products may be greater than of others.

The literature of agricultural economics shows no uniformity in either theoretical or empirical analyses of individual supply elasticity. Heady[12] and D. Gale Johnson[13] have argued that the elasticity of supply

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[12] Earl O. Heady, "The Supply of U.S. Farm Products Under Conditions of Full Employment," American Economic Review, XLV (May, 1955), 228-238.

[13] D. Gale Johnson, "The Nature of the Supply Function for Agricultural Production, American Economic Review, XL (September, 1950), 539-564.

of individual products approaches unity and that this elasticity is approximately the same for price rises and price falls. Glenn Johnson has argued in several places[14] that farmers are responsive to price rises but because of resource fixity are unresponsive to price falls. Thus according to Glenn Johnson, the agricultural production function is more elastic for price increases than for price declines. On the other extreme, Cochrane and Butz[15] argue that the elasticity of supply, whether of the product or of agricultural output in general, is almost totally inelastic. Nerlove[16] estimates that the elasticity of supply for wheat is .93, for cotton .67 and for corn .18 if the elasticity of expectation is taken at less than 1.0, i.e. farmers do not necessarily base their plans on last year's prices. If, however, expectations are based on last year's prices, the estimates become -- for wheat .47, for cotton .20 and for corn .09. These estimates are much closer to those of Kohls and Paarlberg[17] whose estimates of elasticity for thirteen field crops ranged

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[14] Glenn L. Johnson, "Supply Functions - Some Facts and Notions," in Earl O. Heady et al.(Eds.), Agricultural Adjustment Problems in a Growing Economy, op. cit., pp. 74-94; also Glenn L. Johnson, "The State of Agricultural Supply Analysis," Journal of Farm Economics, XLII (May, 1960), 435-452.

[15] W. W. Cochrane and W. T. Butz, "Output Responses of Farm Firms," Journal of Farm Economics, XXXIII (November, 1951), 445-469.

[16] Marc Nerlove, The Dynamics of Supply: Estimation of the Elasticity of Supply (Baltimore: The John Hopkins Press, 1958); also Marc Nerlove, "Estimates of the Elasticities of Supply of Selected Agricultural Commodities," Journal of Farm Economics, XXXVIII (May, 1956), 496-509; Marc Nerlove and Kenneth Bachman, "The Analysis of Changes in Agricultural Supply: Problems and Approaches," Journal of Farm Economics, XLII (August, 1960), 531-554; the last article contains an extensive bibliography of articles dealing with agricultural supply response.

[17] Quoted in Nerlove, The Dynamics of Supply:. . . , op. cit., p. 81

from .07 for corn to .31 for spring wheat.

The above indicates that no definite conclusions can be drawn from the literature with regard to the extent of farmers' responsiveness to price change. Yet it is clear that if the benefits of forward pricing are to be achieved, farmers must be responsive to the "correct" forward prices. A conclusion may tentatively be drawn at this stage, it being that there is considerable doubt as to whether the agricultural producers are price responsive to the extent traditional firm theory implies.[18] If this conclusion is correct, then the value of forward pricing would be somewhat less than the theoretical analysis of Professor Johnson would imply.

The third assumption implicit in Johnson's work is that farmers will respond correctly to price changes. While this may seem to be included in the above, it must be kept clearly in mind that there is a difference between whether or not a farmer will respond at all to a price change and how he responds. The cobweb analysis developed by Ezekiel,[19] and accepted as a sound explanation of commodity price variations, suggests that the time lag in the production of certain agricultural commodities and different elasticities of supply and demand for food products, creates the likelihood that farmers' response to price changes may be ill timed. The analysis of the cobweb theorem has been previously outlined.[20]

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[18]This case has been forcefully argued by W. W. Wilcox, "Effects of Farm Price Changes on Efficiency in Farming," Journal of Farm Economics, XXXIII (February, 1951), 55-65; also see J. M. Brewster and K. H. Parsons, "Can Prices Allocate Resources in American Agriculture," Journal of Farm Economics, XXVIII (November, 1946), 938-960.

[19]Mordecai Ezekiel, "The Cobweb Theorem," op. cit.

[20]See above, pp. 47-48.

The significance of the concept is that even if farmers are responsive to price changes, they may respond incorrectly. The task of the central agency may be now one, not only of estimating price on the basis of future supply and demand conditions, but also adjusting the prices so as to take account of lagged reactions of the farmer to earlier price changes.

The intent to date has been to determine the theoretical foundations of forward prices. A few implications may be noted at this point. If uncertainty prevents optimum resource use by retaining labor in agriculture at the expense of capital innovation, then the question as to what would be the effect of the increased certainty resulting from forward prices, arises. The average cost curve of the agricultural producer would be lowered, if it is assumed that the farmer includes in his estimation of expenses, costs of uncertainty surrounding his production. But if the reduction of uncertainty increases the efficiency of agriculture, presumably greater output would follow from a given body of resources, i.e. the shape of the cost curve has also changed. Thus, if Professor Gale Johnson's marginal equalities (assuming their validity) were achieved yielding increased efficiency at least four possible outcomes are immediately obvious; 1. Given the same factor input in agriculture, a greater volume of aggregate output. 2. Given the same labor input and increased capital inputs (this follows from Johnson's capital rationing argument) greater aggregate output. 3. Less labor input and more capital inputs, more, the same, or much less likely, less aggregate output and 4. From fewer labor inputs and fewer capital inputs the possibility of the same or less aggregate

output.[21] In the short run at least, the first two of these possibilities are much more probable, given the institutional limitations on the mobility of agricultural labor and the fact that hired farm labor is nearly non-existent. Furthermore, substantial evidence[22] exists to suggest that the reduction of uncertainty by the present United States farm programs has increased the rate of capital innovation and increased aggregate output. It follows then, that if uncertainty is reduced by forward prices, aggregate output would increase, at least in the short run. If forward prices are to be a guide to optimum output, which would be a reduction from the existing surplus position, the forward prices announced would have to be lower than present prices. But as outlined earlier, there is evidence to suggest that farmers demonstrate an inelastic response to a fall in price. If the desired response from lowered prices is not forthcoming, while the increased certainty likely would induce a more productive combination of resources, aggregate output of agriculture would expand. Given non-rigid price supports the expanded output could further depress market prices. The salvation then is to reduce the agricultural labor force, and other inputs as fast as price

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[21] These four possibilities assume constant land input, if land is varied additional permutations are added. For a suggestion of this possible outcome arising from forward prices see D. E. Hathaway, "United States Farm Policy: An Appraisal," Journal of Farm Economics, XLI (May, 1956), footnote 2, 181.

[22] Ibid.; also see D. Gale Johnson, "Competition in Agriculture: Fact or Fiction," op. cit.; J. K. Galbraith, "Economic Preconceptions and the Farm Policy," American Economic Review, XLIV (March, 1954) 10-32; Cochrane, "A Theoretical Scaffolding for Considering Prices Policy in Agriculture," op. cit.; and Cochrane, Myth and Reality, op. cit., esp. Chap. 7.

certainty contributes increased productivity. This perhaps explains Professor Gale Johnson's almost exclusive concentration on agricultural labor mobility following his work on forward prices.[23] If labor cannot be moved out at a more rapid rate, and nothing in past experience suggests that labor will move faster than it has in the last ten years, then the outcome, in theory at least, of a successful forward pricing program would be to aggravate the surplus problem and increase rather than decrease the disparity of per capita income between agriculture and the rest of the economy.

Further evaluation of the program of forward pricing as to its cost and benefits and its practical applicability will be deferred to the next chapter. It is sufficient to conclude this section by saying that the theoretical consistency of the policy and the desirability of its theoretical outcome may be considerably less than Professor Gale Johnson leads one to believe.

B. Aggregate Supply Control

The intent of this section is to discuss the theoretical and empirical attributes of Professor Cochrane's model upon which he bases the policy conclusions of aggregate supply control. The model is reviewed in brief terms. On the demand side a severely price and income inelastic demand schedule is postulated and empirical evidence is provided in an attempt to substantiate the hypothesis. Similarly, an almost infinitely inelastic aggregate output curve[24] is postulated which

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[23] See above, p. 32.

[24] See above, p. 46, for a definition of output curve.

indicates the farmers' response to price change. These curves are imposed one on another, to give a price solution. But the price solution in the market is determined by the interaction of realized output and demand. Therefore, Cochrane empirically produces an aggregate supply curve which is severely inelastic and moving to the right as a result of technological innovation. Given these inelastic curves small shifts in either can cause drastic price changes and small quantity responses. The earlier Cochrane model[25] made the demand the causative shift factor. In other words, if the aggregate demand function was shifted by a rise in population, certain results would occur in the short run. The aggregate demand function would shift on a positionally fixed supply function causing a rise in farm prices. The period of rising farm prices tends to cause farmers to innovate for two reasons. 1. the existence of optimistic price expectations and 2. farmers would have ". . . the financial resources to introduce labor saving or capital saving innovations into their farming operations even though the introduction of those innovations would reduce costs in any period."[26] The innovation causes an increase in output, shifting the aggregate supply curve to the right. In period of static or falling prices farmers are not likely to innovate despite the fact that rational profit maximizers should always seek cost reduction.

In other words, Cochrane's conception of farmers' response to

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[25] See above, p. 49-51.

[26] Cochrane, "Farm Price Gyrations. . . ," op. cit., p. 388.

price change is not unlike that of Professor Johnson. In Myth and Reality the treadmill argument is introduced to show that farmers will innovate at any time to reduce costs. The theoretical consistency of Cochrane's model as outlined in the previous chapter given the assumptions of the inelasticities of supply and demand and the treadmill is difficult to attack. Therefore, in what follows the assumptions will be questioned.

That the aggregate demand for agriculture products is highly price[27] inelastic, especially in the short run has been long accepted. Schultz,[28] in a summary of estimates of aggregate demand elasticities for the inter-war period suggests that the elasticity demand at the retail level is around -.25. In other words, food consumption declines 2.5% with a 10% increase in price. Cochrane[29] argues that the elasticity of aggregate demand has declined in the post war years and produces an empirical estimate of between -0.15 and -0.2 for the period 1950-55. Brandow,[30] in a recent study estimates the elasticity of aggregate demand at retail prices at -.34 while the farm price level elasticity is -.23. Nerlove and Addison[31] suggest the elasticity in the short run

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[27] All elasticities in this section are arc price elasticities unless expressly stated otherwise. They are derived from the demand or supply function within the historical range of prices and do not apply to the total curve.

[28] T. W. Schultz, Economic Organization of Agriculture (New York: McGraw-Hill, 1953), Table 11-1, p. 188.

[29] Myth and Reality, op. cit., p. 39.

[30] G. E. Brandow, Interrelations Among Demands for Farm Products . . . , op. cit., p. 4.

[31] Marc Nerlove and W. Addison, "Statistical Estimation of Long-Run Elasticities of Supply and Demand," Journal of Farm Economics, XL (November, 1958), 869.

to be -.24 and in the long run -.83. If the long-run elasticity estimate of Nerlove and Addison is excluded, there is a considerable grouping of estimates of elasticity in the range of -.20 to -.25, indicating an inelastic demand function over the relevant range of prices.

While there is substantial literature[32] on why the aggregate supply curve could be expected to be inelastic, few attempts have been made to measure the function's elasticity. It is reasoned that aggregate supply will be inelastic on the grounds that supply functions for the major factor inputs will be severely inelastic. Alternative uses of agricultural resources are limited and prices must fall substantially before resource transfers would occur. This partially explains the constancy of agricultural output during depressions and in periods of falling prices. It is likely that supply response to price changes is greater for upward price movements than for falling prices.[33] But the literature does not agree with Cochrane that the aggregate supply function is totally inelastic.

Professor Cochrane uses times series data to substantiate his hypothesis that the aggregate supply function is highly inelastic. Plotting the index of aggregate food production for sale on the horizontal axis and the index of responsible prices on the vertical axis, the response

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[32] To list only a few of the more important ones, see Heady, "The Supply of U. S. Farm Products. . . ," op. cit.; D. Gale Johnson, "The Nature of Supply Function. . . ," op. cit.; Cochrane, "Conceptualizing the Supply Relation. . . ," op. cit. and Glenn L. Johnson, "Supply Function: Some Facts and Notions. . . ," op. cit.

[33] See above, p. 71.

of United States agricultural[34] producers demonstrates a pattern shown in Fig. 4.1.

It can be seen that Cochrane produces three highly inelastic and positionally fixed supply curves AA, BB, CC. The years which do not fall on these curves, 1922, 1938 - 1944 and 1952 - 1956 are quantity points, caused by the inelastic supply function being shifted on a fixed demand curve. In the only other attempt at the measurement of aggregate supply elasticity, Griliches[35] says, ". . . our findings indicate small but definitely positive supply elasticities; about 0.1 to 0.2 for the aggregate and all crops, and 0.2 to 0.3 for livestock and livestock products." Thus it appears that Cochrane stands alone, both on theoretical and empirical grounds, in maintaining that the aggregate supply function is infinitely inelastic. In the discussion to follow, Canadian data will be introduced to further substantiate the conclusion here stated that the aggregate supply function is highly inelastic in the short run but not infinitely inelastic. The conclusion that farmers are totally unresponsive to price changes is open to serious question.

However, the most questionable feature of the Cochrane model is the general theory of the treadmill. Even if the assumption of highly inelastic supply and demand are granted, there does not seem to be sufficient evidence to justify the conclusion that farmers will continue to

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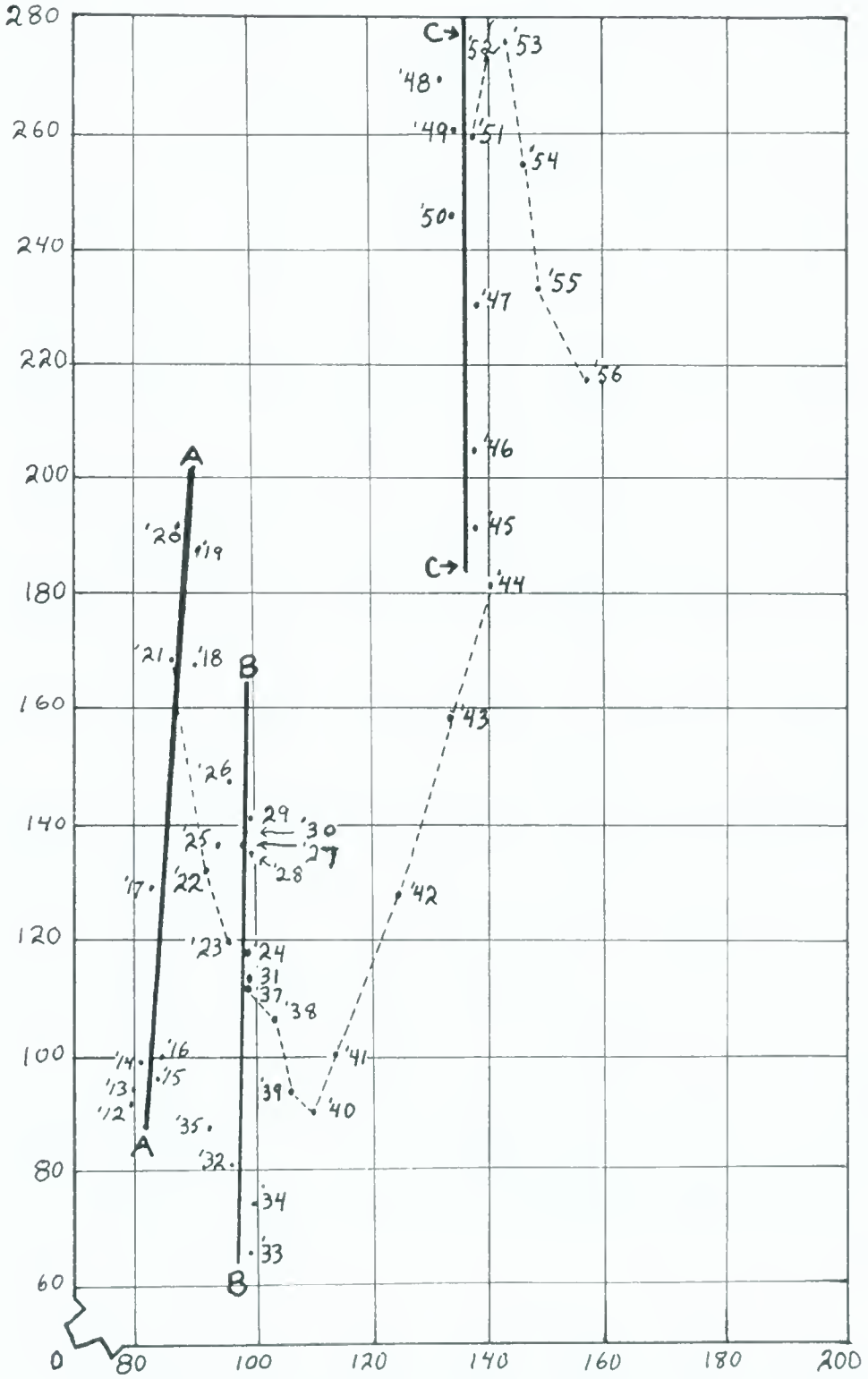
[34] This paper will not take issue the statistical method used by Cochrane although others have been critical of the methods. See for example Mackenzie, The Changing Cost Structure. . . , op. cit.

[35] Zvi Griliches, "Estimates of the Aggregate U.S. Farm Supply Function," Journal of Farm Economics, XLII (May, 1960), 282-293.

Figure 4.1

Agricultural Supply Response - United States

(1912-1956)



Index of Aggregate Food Production for Sale

(1935-39 = 100)

Source - Farm Prices: Myth and Reality, p. 49

innovate in spite of price conditions. It will be remembered that in Cochrane's earlier work, the shift in the output function was demand induced. As demand expanded, favorable price expectations and increased profitability from rising prices, provided the incentive and the resources to invest in new equipment. In Myth and Reality the farmer is motivated by cost reduction, but not price rises, i.e. partial profit maximizing goals to the exclusion of all other factors. This is the theory of the treadmill. While the theory of the firm would suggest that a profit maximizing entrepreneur would act in a manner to introduce cost reducing techniques constantly, constraints definitely exist. The first of these is that of capital availability. Both Cochrane, in earlier work, and Gale Johnson have placed heavy emphasis on the restriction on capital innovation induced by the limitations of funds to do so. It seems logical that innovation is in fact subject to the constraint of the availability of internal and/or external funds. If, as Cochrane contends, the continual increases in supply decrease agricultural profitability and further that falling and uncertain prices restrict the willingness of external lenders to loan farmers money, it seems to follow that supply expanding innovations would sow the seeds of their own slowdown. While farmers might want to innovate the constraint of limited internal and external funds would eventually prevent continuous innovation.

Second, Cochrane's earlier premise that farmers are more prone to invest in periods of favorable prices and profits seems to bear closer relationship to the actual operation of the firm. The role of expectations in investment activities is clearly important and closely

tied to the degree of uncertainty surrounding the investment decision. It seems unlikely therefore that farmers would rationally continue to invest indefinitely in the face of uncertain and declining prices. But farmers may have motives for investment other than simple cost reduction or favorable expectations induced by rising prices. Farmers may simply invest excess earnings when they are available. If the extent of profits or retained earnings is high, as it was in the United States and Canada in the early 1950's, then a high rate of investment could occur. This failing to differentiate between the savings and investment function, which is suggested as a reason for the heavy investment in farm equipment in the period of favorable prices, is not limited to agriculture. Clearly the preference of business firms for internal financing[36] indicates the same reaction of investing available earnings with less regard for the rate of return on investment than investment theory would suggest. The above is not offered as a complete explanation of the high rate of agricultural investment during periods of favorable prices and profits, but is offered to suggest that the theory of the treadmill may be overlooking many other factors. An additional factor which may contribute to investment is the ease by which farmers can obtain intermediate[37] agricultural credit through a variety of government agencies. This is especially the case in the United States

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[36] See William H. White, "Interest Inelasticity of Investment Demand - The Case from Business Surveys Re-examined," American Economic Review, XLVI (September, 1956), 564-587; Edgar M. Hoover, "Some Institutional Factors in Business Investment Decisions," American Economic Review, XLIV (May, 1954), 201-213; also see J. R. Meyer and Edwin Kuh, The Investment Decision: An Empirical Study (Cambridge: Harvard University Press, 1957).

[37] By intermediate credit is meant a period of one to five years.

where the availability of credit may speed up the process of innovation in agriculture.

Mackenzie[38] has produced empirical evidence to suggest that the net capital invested in machinery and equipment in Canadian Agriculture has declined in the face of falling prices of the late 1950's. Table 4.1 reproduced from Mackenzie's work clearly indicates this fact.

Table 4.1

Net Stock of Capital in Machinery and Equipment

Canadian Agriculture 1926-1960

1949 dollars, millions

1926	521.2
1936	535.6
1946	775.3
1956	2067.6
1957	2020.3
1958	1967.0
1959	1943.5
1960	1921.9

Source: Wm. Mackenzie, The Changing Cost Structure and Relative Profitability of Agriculture in the Regions of Canada, Unpublished Ph. D. Thesis, (Oxford: Oxford Library, 1961), p. 223.

Mackenzie concludes:

> . . . the capital stock (has) stopped expanding and in very recent years net investment has not been sufficient to meet replacement. . . . Thus it took about three years of falling prices to stem the flow of capital into agriculture, and in the fourth year the stock was being depleted.[39]

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[38] The Changing Cost Structure. . . . op. cit., p. 222.

[39] Ibid., pp. 222-223.

This evidence substantiates the contention that the innovation process in agriculture will not continue over extended periods of time in the face of falling prices and profits.

An answer to the question of why Cochrane changes from the demand induced supply expansion to the treadmill theory can now be attempted. A review of Figure 4.1 (see above p. 81) indicates that previous to 1952 aggregate supply in the United States did seem to expand in response to price rises, but the period of supply expansion from 1952-1956 in the face of falling prices is not so easily explained. Thus, Cochrane sought to explain this phenomenon by the treadmill theory. There is nothing in the data of this five year period to invalidate the treadmill thesis, for supply did expand in the face of falling prices. However, this period is insufficient for the basing of a major conclusion on the nature of agricultural supply response. It would seem to follow that if the treadmill theory held true, three trends should have persisted in United States agriculture since 1956: 1. Output should have continued to expand in a regular and persistent pattern. 2. Prices should have continued to fall. 3. Productivity in real terms should have continued to improve. In Table 4.2 an attempt is made to extend the indices used by Cochrane in an earlier article,[40] to explain supply response.

The following tentative conclusions can be drawn from the above data, but they must be severely tempered by the conditions of government

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[40] The writer has been unable to extend the indices used by Cochrane in Myth and Reality, therefore the indices used are the same as used by Cochrane, "Farm Price Gyrations," op. cit.

Table 4.2

Index Numbers of United States Agriculture

(current dollars)

Year	(1) Farm Employment (1910-14-100)	(2) Agricultural Production for Sale and Home Use (1947-49-100)	(3) Production Per Man-Hour (1947-49-100)	(4) Prices Received (1910-14-100)
1946	76	98	91	236
1947	77	95	92	276
1948	76	104	104	287
1949	73	101	104	250
1950	73	101	112	258
1951	70	104	114	302
1952	67	108	124	288
1953	65	109	131	255
1954	64	109	140	246
1955	62	113	149	232
1956	58	114	158	230
1957	56	114	168	235
1958	55	124	188	250
1959	54	125	195	240
1960	52	129	208	238
1961	51	130	+	240
1962	+	129	+	244

Sources: Agricultural Statistics, United States Department of Agriculture 1961: Column 1, Table 452; Column 2, Table 660; Column 3, Table 670; Column 4, Table 685. 1961-62 data from Demand and Price Situation, United States Department of Agriculture, August, 1962.

+ Data not available.

policy that have prevailed in the United States over the period for which the series was produced. The extent to which the price supports have prevented the interaction of quantities of agricultural products supplied and demanded in the market from achieving an equilibrium price is an unknown factor. In other words, price supports no doubt distort to some extent the effects large supplies of farm commodities might have had on market prices. Similarly attempts at acreage reduction and control may well have reduced to an unknown extent the quantities of agricultural products flowing into the market. Thus the suggested trends demonstrated in the series must be considered in the light of these qualifications.

The indices indicate that the aggregate agricultural output expansion has been uneven and that output to some extent stabilized in the period 1958 to 1962. The index of prices received has been relatively constant from 1959-1962 and if anything shows a slight increase. Output per worker has continued to rise but much of this can probably be explained by the steady reduction in the agricultural labor force over the same period. While one cannot generalize from this limited information, there does seem to be evidence that the degree of output expansion experienced in the period 1951-1958 has not persisted since then. Similarly prices have not continued the dramatic downward spiral, characteristic of the period 1951-1957.

As noted with respect to the United States price and quantity indexes, the effects of support programs are no doubt reflected in the Canadian figures produced in Table 4.3. However, it may be safely argued that less of the effects of price policy are reflected in Canadian figures

Table 4.3

Index Numbers of Canadian Agriculture

(1935-1939 - 100)

Year	(1) Farm Employment	(2) Agricultural Output	(3) Output per Worker	(4) Prices Received by Farmers
1946	94	126	134	204
1947	88	116	131	216
1948	87	125	141	256
1949	85	122	143	255
1950	80	137	171	261
1951	74	155	209	297
1952	71	166	234	274
1953	68	158	232	250
1954	70	120	171	237
1955	65	150	230	233
1956	62	169	272	235
1957	59	134	227	234
1958	57	145	254	245
1959	55	145	263	247
1960	54	154	285	250
1961	54	127	233	253
1962	52	+	+	253

Sources: Column 1, The Labor Force, Dominion Bureau of Statistics, 71-001; Column 2, Quarterly Bulletin of Agricultural Statistics, Dominion Bureau of Statistics, 21-003; Column 3 - Column 2/Column 1; Column 4, Index Numbers of Farm Prices of Agricultural Products, Dominion Bureau of Statistics, 62-003.

+ Data not available.

simply because of the fact that Canadian price policy has not been as extensive nor as rigid as American policy. The Canadian figures are more erratic.[41] It is clear that aggregate output in Canada has not expanded as rapidly in the last five years as in the early 1950's. Similarly, prices received have risen steadily since 1957. The output indices argue strongly for the case that weather, as well as technological innovation, has a strong effect on the movements of aggregate output. Thus, the Canadian data does not necessarily bear out Cochrane's thesis, and if anything, the opposite is shown. This preliminary investigation of Canadian agricultural responsiveness suggests the need for a further review of Canadian agriculture.

Mackenzie[42] in a study designed to test empirically the changing costs and profitability of Canadian agriculture, devotes a chapter to producing the same empirical measures of supply response, using Canadian data as reproduced by Professor Cochrane. In a manner similar to Cochrane, the index of the gross volume of output is plotted against the index of prices received to achieve a supply response pattern for Canada. The results for Canada are shown in Figure 4.2. Mackenzie concludes:

> . . . while these data lend considerable support to Cochrane's thesis regarding technical innovation and its effects on supply response, they are insufficient evidence to suggest, as he does, that the supply curve moves to the right in some erratic, but persistent fashion.[43]

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[41] The strong influence of Prairie grain production on aggregate agricultural output in Canada is reflected in the output indices of 1951-52-53 as series of good crop years and 1954 and 1961 two drought years in the prairies.

[42] Mackenzie, The Changing Cost Structure. . . , op. cit.

[43] Ibid., p. 218.

While comparison of Canadian response (Fig. 4.2) to the United States response (Fig. 4.1) indicates strong similarities, especially with regard to output expansion in the face of falling prices in the period 1951-56, Mackenzie chooses to explain this in terms of lagged output expansion, which resulted from the occurrence of two conditions in the late 1940's and early 1950's. First, a period of high world demand and rising world prices in the immediate postwar period and second, the body of technological innovations pent up during the war, suddenly being released on agriculture with the resultant heavy capital investment. In other words, the rapid expansion of output in the early 1950's may be explained by rather abnormal circumstances of the times.

> The empirical data produced . . . certainly leaves open to doubt the degree to which the supply curve of agricultural production is completely inelastic and fixed over extremely long periods. If the changes in capital and labor resources are any guide it took three years for the price fall to register its effect (1953-56) and in the next three, while there is no sign that the curve is now moving backwards, there is no sign either that the price level is falling further or that the supply curve is continuing to move forward.[44]

The results of Mackenzie's work lend additional evidence that farm firms do react, though with a substantial lag to price change. Cochrane's case that supply will continually be propelled outwards by technological innovation in normal times, is seriously open to question.

D. Gale Johnson,[45] in a comparison of the effects of the price policies in the United States and Canada, reaches two relevant conclusions. First, almost identical to that of Mackenzie:

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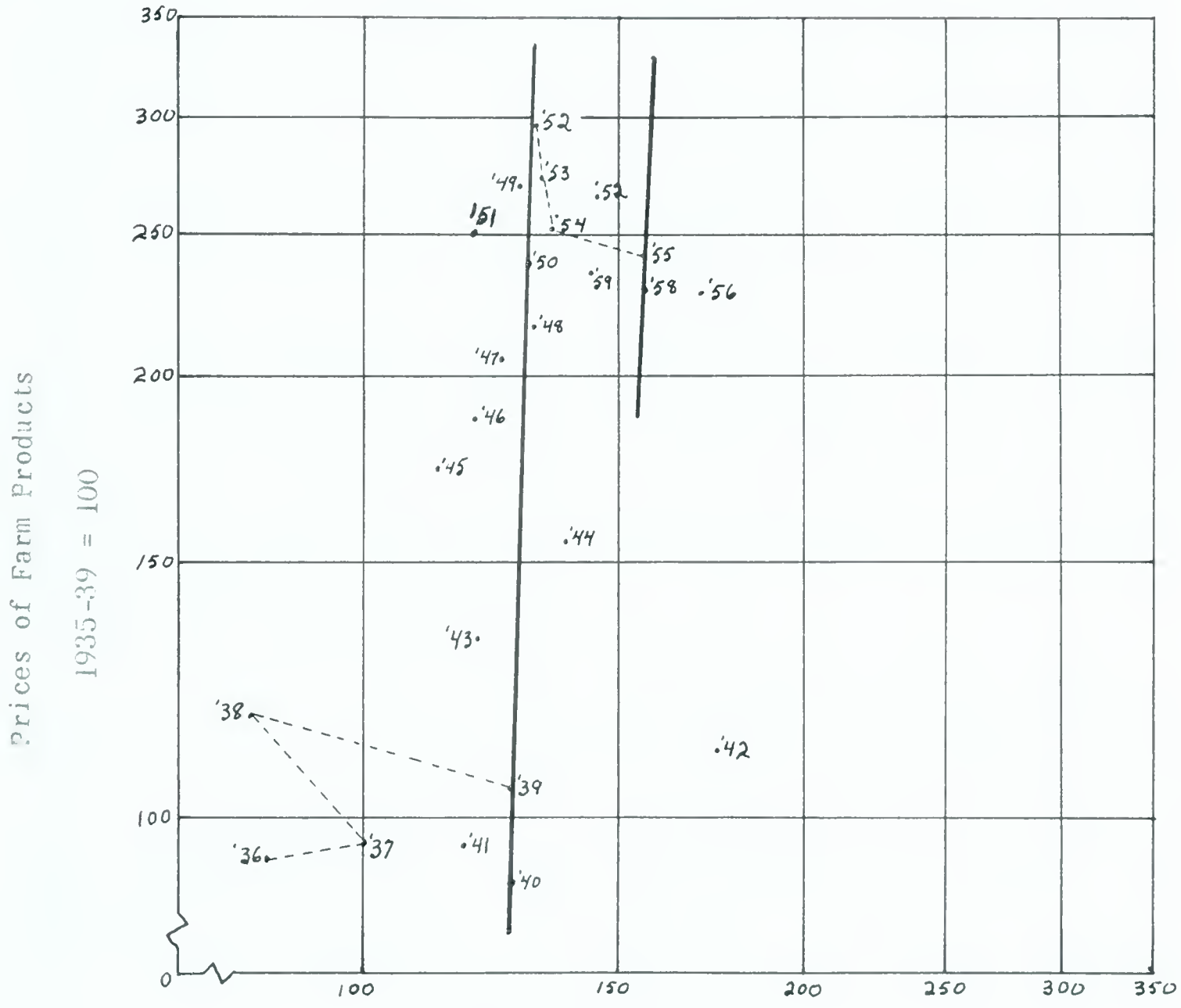
[44] Ibid., p. 226.

[45] D. Gale Johnson, "Income and Resource Effects. . . ," op. cit.

Figure 4.2

Supply Response - Canada

(1936-1959)



Source: Wm. Mackenzie, Changing Cost Structure. . . , op. cit., p. 220.

> . . . the Canadian experience supports the prediction of the traditional theory of the firm and the industry that output grows in response to changes in demand and factor supply conditions and does not increase 'willy nilly' in response to purely technological considerations.[46]

Secondly, Johnson concludes that the greater freedom of price movement in Canada has had a more significant resource allocative effect than parity prices have had in the United States. Johnson argues that the changes in relative prices between grain, which have fallen, and livestock prices, which have risen, have been greater in Canada than in the United States, and at the same time traditional theory would predict that resource adjustments from grain production to livestock production have been greater in Canada than in the United States. This indicates that prices, to some extent at least, allocate resources. The artificial holding up of prices then may well retard the adjustment of resources to changing conditions in agriculture.

The intent of this section on the theory of aggregate supply control has been to test the validity of Cochrane's postulates, especially the "inevitability of output outrunning demand." Considerable doubt has been thrown on the theory of the treadmill that farmers continually innovate despite price conditions. This has been argued, both on grounds of the limitations of the availability of investment funds caused by falling prices, and on the empirical evidence produced to show that Canadian agriculture has responded to price change but with a fairly substantial lag. The conclusion of this section then

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[46] Ibid., p. 37.

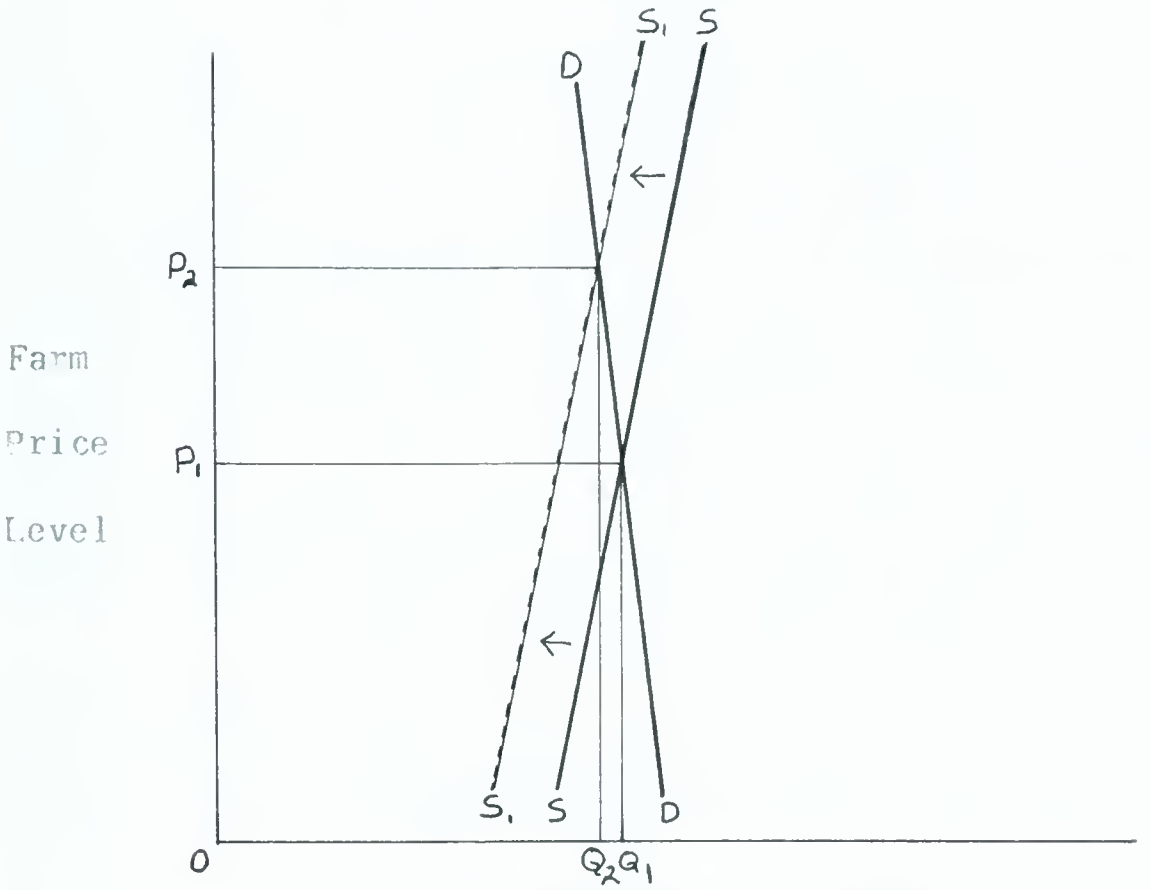
suggests that farmers in Canada, and likely in the United States, are not totally unresponsive to price falls and further that the aggregate supply function does not persistently shift outward. Thus, the "myth of automatic adjustment" which Cochrane so dislikes still holds some truth. Agriculture, because of the rigidity of social framework within which it exists, in addition to the apparent rigidity of agricultural resources, is slow to adjust to changing conditions. In all likelihood the sector has been out of equilibrium for the past three decades, but this does not say that the adjustment process is not working. The period from 1930 to the present has been characterized by sporadic abnormalities, depression, wars and other factors which have forced a new period of adjustment on agriculture before an equilibrium could be reached. It therefore follows that the chronic disequilibrium about which Cochrane is concerned has existed more likely because of the abnormal conditions of the period than because of the inevitability of technological innovation. The appropriateness of proposing a rigidly controlled agriculture through supply control with the effects on agricultural adjustment implicit in this type of program, is open to serious question.

The one question remaining about the theory of supply control is whether or not, given Professor Cochrane's assumption, it could be successful in increasing farm income. In simple terms, given an inelastic aggregate demand function and an inelastic aggregate supply function, the shifting of the supply function to the left will necessarily raise the farm price level. Thus given the assumptions of the model, i.e. inelastic demand and supply contraction of supply does

raise prices and therefore gross farm income. Further it can be seen from Figure 4.3 that a relatively small contraction of supply significantly raises price.

Figure 4.3

Supply Control



Professor Brandow[47] has shown empirically that if the elasticity of aggregate demand is -.23 in the relevant price range, and given the conditions prevailing in the United States in 1955-57, that a policy of supply control could have increased farm income by 38% while the cost of living in the same period would have been at the most 2% higher. On the other hand Brandow argues that if free market conditions had existed in that same period farm net income would have been

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[47] Brandow, "Interrelations Among Demands. . . ," op. cit.

35% lower than it really was, while the urban cost of living would have only been 1.5% lower. Thus, concludes Brandow, other things equal, supply control could achieve significantly higher aggregate farm income with relatively little effect on the cost of living. It is clear then that theoretically supply control could achieve higher farm income, if the questionable assumption of constant patterns of food consumption is made. Contrary to Brandow, Professor Johnson[48] has argued in a recent publication, that there is a political limit, of perhaps ten to fifteen percent, as to how far farm income can be raised by increased prices as a result of government action. Johnson has further argued that farm income per capita only can be raised in roughly the same magnitude as price rises. In other words, if farm prices are raised 10% by government action, farm income would rise about the same amount. Thus, the theoretical possibility of increased income may be limited by political and also practical considerations. But nothing to date has been said about who would receive the increased income or what would be the other implications of supply control on agriculture and the rest of the economy. These questions will be dealt with in the next chapter, when the overall effects of supply control are evaluated.

IV. Summary

It has been found that the conception of the agricultural problems held by both the schools under review is similar in that the

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[48]D. Gale Johnson, "Efficiency and Welfare Implication of U. S. Agricultural Policy," The University of Chicago, Office of Agricultural Economics Research Paper No. 6212, December 13, 1962.

problems of resource allocation and income inequalities are recognized. Similarly the goals held out for agricultural policy is alike, although Gale Johnson emphasizes efficiency or resource goals almost to the exclusion of income goals. Cochrane, on the other hand, seeks to achieve the income goal, and is prepared to sacrifice some resource efficiency in achieving this goal. The use by Johnson of traditional marginal welfare theory as a guide to policy has been laid open to question on the grounds of Pigou's divergences between social and private costs and benefits and the theory of the second best. Also, it has been shown that the results of reduction of uncertainty may aggravate the surplus and income problems of agriculture. Cochrane's analytical model has been questioned primarily on the grounds of the inevitability of supply increase regardless of price conditions. Thus it is concluded that neither concept from the theoretical point of view is above reproach.

CHAPTER 5

THE PRACTICAL APPLICABILITY OF FORWARD PRICES OR SUPPLY CONTROL FOR CANADIAN AGRICULTURE

I. Introduction

> Economic analysis can indicate the probable results of an assumed course of action. But political and practical considerations can prevent realization of the assumptions and thus alter results.[1]

In light of the possible difference between the theoretical and actual outcome of policy, the basic intent of this chapter is twofold; to discuss in general terms the administrative problems likely to be encountered in the implementation of forward prices and supply control; and to appraise the probable success of the policies in achieving the goals of agricultural policy enumerated by their exponents.

II. The General Applicability of Selected Price Policies

A. Administrative Needs of Forward Pricing

That forward prices could be administered without major difficulties seems fairly well accepted. By this is meant that experience in Canada with present administrative agencies suggests that a program of announcing forward prices in advance of the production period could

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[1] W. E. Hamilton, "Comprehensive Supply Control: The Farm Bureau Viewpoint," Journal of Farm Economics, XLII (December, 1960), 1182.

be carried on with little change to existing machinery. Both the Wheat Board and the Stabilization Board do announce a type of forward price which will be guaranteed. Burton,[2] in a detailed analysis of the possibilities of forward prices for Canada, concludes that given accurate price forecasting there would be no insurmountable difficulties in the mechanics of operating forward prices for the major agricultural commodities produced in Canada. Burton's detailed program involved the supplementary use of a storage program by which the announced forward price could be approximated. But Burton's major concern was the accuracy of forecasting the "correct" price, a problem raised in the last chapter, and one which will be considered below. It is concluded that the administrative difficulties of operating forward pricing would not be large. There seems to be nothing to prevent the Canadian Wheat Board from announcing its initial payment prices on, say March 1st, instead of August 1st. (This says nothing of the ability of the Board to forecast correctly.) This would give the relative price structures of grain prices prior to the planting of the crop. Similarly the Stabilization Board does now announce the level of price support at least one year in advance. Experience in the United States and the United Kingdom also suggests that administrative difficulties would not prevent the operation of a forward price program. In the United States, the parity price support program has been since 1933 a forward pricing program of sorts. The level of support has been announced at least

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[2] Gordon L. Burton, A Price Policy for Canadian Agriculture. (Ph. D. thesis submitted to Iowa State College - 1946), Library of the Graduate Faculty of Iowa State College, Ames, Iowa.

one year in advance of the marketing time. Similarly the British Program from 1946-1957 utilized forward prices extensively with some success.[3] But neither of these forward price programs has been of the nature under discussion in this analysis. The United States Program has been one announcing forward support prices on the basis of past prices, i.e. parity prices. The British Program was one of production inducement rather than curtailment. While the mechanics of forward price have been operative, the price announced was not a forward price anticipating future conditions of supply and demand. Thus the major practical problem of forward pricing, that of accurate price forecasting, appears to have no precedent. This assumption, that a central agency can forecast future prices with accuracy, is the major question left open in the discussion of forward prices. It will absorb the remainder of the discussion of forward prices.

To the writer's knowledge, no major empirical study exists which has analyzed the accuracy of government agricultural prices forecasting. Both the Canadian and United States Departments of Agriculture have for many years published outlook information which has been reasonably successful in predicting trends in prices.[4] But these agencies, especially the Canadian one, have been hesitant to

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[3] See William E. Heath, "Agricultural Price Policy in the United Kingdom," Journal of Farm Economics, Vol. XXXIII (August, 1951), 311-319, and Gavin McCrone, The Economics of Subsidizing Agriculture, (Toronto: University of Toronto Press, 1962.)

[4] United States Department of Agriculture, Demand and Price Situation, published monthly by The Economic Research Service, Washington, D.C. and Current Review of Agricultural Conditions in Canada, The Economics Division, Canada Department of Agriculture, Ottawa, especially the Situation and Outlook issue.

forecast the exact prices likely to exist. If, however, forward prices are to be operative, a government agency must be prepared to announce the price likely to exist at least a year in advance, and furthermore be bound by that price despite any changes in underlying conditions that may occur. While it seems reasonable to assume as does Johnson, that some central agency with statistical information and expert knowledge should be in a better position to anticipate expected prices than the individual farmer, the important question is how much better prices forecasts of this nature would be. The major agencies doing this type of forecasting have been private organizations. But of more importance is what would be the effects if the agencies' price forecasts were significantly in error.

It has been accepted by agricultural economists for many years that agriculture is subject to many conditions yielding uncertainty. Not the least of these has been variations in weather. A brief glance at the index of Agricultural Output in Canada (see Table 4.3, page 89) shows the strong influence of weather on Canadian agricultural output. While it could be argued that the existence of long-term averages indicates the range of prices likely to exist, there seems to be a major difficulty in forecasting accurately the quantities of commodities produced and demanded, and the prices likely to exist in any given year. Table 5.1 shows the variations in final prices received for No. 1 Northern Wheat in Canada in the last twelve years. These figures reflect weather variations, changing world demand conditions and acreage changes, and point out the task confronting a price forecasting agency. The futures market provides a very imperfect indication of future conditions of supply

Table 5.1

Final Prices Received For No. 1 Northern Wheat

Basis Fort William 1950-1962

Crop Year	Initial Payment	Interim Payment	Final Payment	Total Price Realized
1950-51	1.40	.20	.258	1.858
1951-52	1.40	.20	.236	1.836
1952-53	1.40	.32	.099	1.816
1953-54	1.40	.10	.064	1.564
1954-55	1.40	.10	.151	1.651
1955-56	1.40	.10	.109	1.609
1956-57	1.40	.10	.088	1.588
1957-58	1.40	.10	.121	1.621
1958-59	1.40	.10	.096	1.596
1959-60	1.40	.10	.090	1.590
1960-61	1.40	.10	.291	1.791
1961-62	1.50	nil	.406+	1.906

Source: Report of The Canadian Wheat Board - 1961-1962.
+ Edmonton Journal, March 23, 1963.

and demand. But the market is a collection of individuals (the trade) who presumably are rationally attempting to anticipate future prices of commodity, as would be the central agency under a forward pricing scheme. The success of the futures market in providing efficient price predictions to guide production planning is certainly not perfect, yet there seems to be some reason to assume that if the future's

market has been unable to predict prices accurately that a Central Government Agency may also experience some difficulty.

The major practical difficulty of forward pricing then is the accurate predicting of forward prices. This function is vital to the successful operation of the program. Further it seems logical that after some years of operation of the plan, if past prices are used for forecasting at all, that previous administered forward prices could become indistinguishable from market prices. In other words, despite Johnson's denial that forward prices would not interfere with the price system, it seems clear that a long period of operation of forward pricing would be subject to the same criticisms of price administration without reference to the market as is the present United States parity program, the Canadian Stabilization Act and for that matter supply control. To conclusively prove the errors likely to occur in price forecasting would require an empirical study which is outside the scope of this paper. On a priori grounds, however, it is concluded that price forecasting could not be totally accurate. The possibility of political intervention into the price setting must not be overlooked, when the importance of the farm vote in Canada is considered.

In the practical sense, it seems clear that no major difficulties would preclude the operation of a forward pricing scheme in Canada. The major practical difficulty is that of the accuracy of price forecasts. The acceptance by Canadian Agriculture of the present government price programs suggests that no resistance from an ideological viewpoint likely would be forthcoming.

B. The Administration of Supply Control

That administrative details would not prevent the implementation of supply control cannot be said with the same degree of certainty as it was for forward prices. Professor Brandow, one of the major contributors to the literature on supply control, has said, ". . . when one turns from consideration of supply control in the abstract to ways and means of carrying it out, he finds a number of problems that will limit and modify actual programs."[5] It is not the intent here to analyze the problems likely to be encountered in the implementation of supply control in detail.

The success of a farm program in a democratic state depends in large measure on the acceptance of the program by the majority of farmers concerned. It is not here intended to extol or criticize those who maintain that supply control is the first step towards a police state,[6] but it is contended that the implementation of aggregate supply control in Canada could be workable only if the majority of farmers, either through their organizations or by plebiscite, were to agree to supply control. If agriculture were in a uniformly depressed state the possibilities of acceptance of supply control would be greatly improved. But in Canada certain segments of agriculture are in a fortunate

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[5] Brandow, "Supply Control: Ideas, Implications, and Measures," op. cit., 1173. This article contains an excellent discussion of the ways and means of supply control.

[6] For a statement of this point of view, see K. Brandt, "Guidelines for a Constructive Revision of Agricultural Policy in the Coming Decade," Journal of Farm Economics, XLIII (February, 1961), esp. 8-9.

position, notably cattle producers. Thus it seems likely that these sectors of agriculture would be somewhat reticent about accepting programs which would restrict their output. As will be expanded on below, aggregate supply control to be successful requires total control of agriculture or the resources inactivated in the controlled areas would likely move to non-controlled areas causing output expansion. The difficulties experienced by the United States feed grain program, which bears many similarities to the type of supply control being discussed here, in receiving farmer acceptance exemplifies the problem. The failure of the U. S. Dairy program amplifies the problem of acceptance. Despite Professor Cochrane's feeling that only products sold in off farm markets need be controlled, it has been argued convincingly by Brandow[7] that if supply control is to be operative, agriculture in total must be controlled. The complexity of the administrative unit required to administer and police the system of quotas suggested by Cochrane must be considered as a major obstacle to the implementation of the program. The administrative unit for Canadian Agriculture would have to be much larger and more complex than the present one, for if only certain segments are controlled, United States experience indicates that resources supplanted from the controlled area will likely flow into the non-controlled area causing price and income problems. The acreage control program in the United States, which admittedly is an attempt to control inputs rather than outputs, has shown that if

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[7] Brandow, "Supply Control: Ideas. . . ," op. cit.; and Brandow, "Interrelations Among Demands. . . ," op. cit.

acreage is controlled, the inputs, notably fertilizers, are used more heavily. It follows then that unless agriculture is a controlled unit, supply control would be less effective. But as submitted by Cochrane, and clearly shown by Brandow the problem of total control would be extremely difficult if not impossible. If, for example, an adequate system of quotas were not implemented, and policed, the development of a "black market" trade outside of controlled agriculture would inevitably develop.[8] But how would an agency police the output of some 480,000 farmers in Canada? How would the agency control inter-farm sales of products? Similarly it has been shown that for effective control in the feed-livestock complex inputs of resources also would have to be controlled.[9] The complexity, size and costs of a central agency charged with the responsibility of administering supply control would undoubtedly seriously hinder political acceptance of the program. Agriculture does not produce a homogeneous product but many products, in addition some products are inputs for other agricultural products. It therefore follows that abstract consideration of agriculture in the aggregate and policy recommendations for the total ignore the interrelationships and complexity of agriculture. The suggestion by Cochrane that if the ends of the program of supply control are deemed desirable, the ingenuity of people will develop the means cannot be accepted as an answer to the administrative problems suggested above.

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[8] See Brandt, op. cit.

[9] See above Chapter 3, pp. 59-60.

But this is not all, Brandow and Cochrane have both recognized the need for a storage program as well. The agency would set a "fair" price and attempt to adjust supply by means of quotas, so that the market would achieve that price. Given the unpredictable nature of natural conditions which effect aggregate agricultural output, storage would be required to achieve that price. The agency also would be faced with a demand and price forecasting problem. Admittedly this problem is not so severe as for forward prices, for in supply control the price would be a politically determined "fair" price. This price would of necessity, however, have to bear some relation to prevailing market conditions, if the possibility of permanent potential surpluses were to be eliminated.

The operational problems raised to date have been of an internal nature. However, Canadian agriculture, especially the grain sector, depends heavily on external markets. The enhancement of domestic prices by supply restriction would require export subsidies or at least an operative two price system, to enable Canadian wheat to flow into the world market. This would be essentially the same as the export subsidy program in operation in the United States. But two significant differences exist between Canada and the United States, with regard to agricultural exports. First, agricultural exports are much more important to the Canadian Economy and particularly the Agricultural Sector, than in the United States. (Table 5.2 sets out this.) Secondly, Canada's limited economic strength in comparison to that of the United States makes the violation of the principles of the General Agreement on Tariffs and Trade and The International Wheat Agreement more likely

Table 5.2

The Dependence of Canada and the United States on Exports: A Comparison 1961 (current dollars)

	United States	Canada
Gross National Product (Billions $)	518	37
Value of All Exports (Billion $)	20	6
Value of Agricultural Exports (Billion $)	5	1.1
Gross Farm Income (Billion $)	40	2.8
Value of Wheat Exports (Billion $)	1.1	.712
Exports as a % of G.N.P.	3.9	16.0
Agricultural Exports as a % of G.N.P.	.9	3.3
Agricultural Exports as a % of Total Exports	25.0	20.0
Wheat as a % of Agricultural Exports	22.0	65.0
% of Total Wheat Production Exported	49.0+	63.0
Agricultural Exports as a % of Gross Farm Income	12.5	40.0

Sources: United States; International Financial Statistics, International Monetary Fund, XVI (January, 1963) and The Farm Index, United States Department of Agriculture, 1 No. 3 (December, 1962).

Canada; National Accounts, Income and Expenditures, 1961. Dominion Bureau of Statistics, and Current Review of Agricultural Conditions in Canada, Canada Department of Agriculture, XXIV No. 1 (January, 1963).

+ This figure is made up to a significant extent by sales under P.L. 480 and other surplus disposal programs.

to invite retaliation by other nations. The Canadian wheat exports, which are a significant proportion of total exports, would be particularly vulnerable if foreign retaliation were to arise. The cost of subsidizing the export of Canadian agricultural commodities by means of a two-price system would increase considerably the cost of agricultural support. If domestic prices are enhanced by a supply control program it follows that import restrictions would be needed to prevent the inflow of commodities from other nations. This might be the case, for example, for meat products from Australia and New Zealand. Thus while the advocates of supply control may largely ignore the external complications of supply control in the United States, the same cannot be done in Canada. The possibility of external retaliation as well as the costs involved lessen the likelihood of the acceptability of supply control in Canada. The above has only suggested areas of difficulty in the administration of a comprehensive program of supply control in Canada. It is evident that if supply control is to be effective, it must be all embracing. The sale of every unit of agricultural output must be controlled. The difficulty and cost of policing this sort of program, though not estimated, would be large. Canadian agriculture particularly, because of its diverse nature does not appear to lend itself to this sort of control. Thus, while ". . . means are available by which a large measure of supply control can be achieved if it is really desired, . . . practical limitations will cause actual programs to fall short of the abstract ideal."[10]

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[10] Brandow, "Supply Control: Ideas. . . ," op. cit., p. 1177.

III. An Evaluation of the Policies

It is now possible to draw general conclusions about the extent to which the policies achieve the goals of policy set out for them by their exponents. Further some attention will be given to discussing the desirability of the policies for Canada. This will be done under two headings, the likely effectiveness of each of the policies in solving the Farm problem given their theoretical and practical shortcomings and the general economic costs and benefits likely to arise for agriculture and the economy in general.

A. Effectiveness in Achievement of Goals

The general goals of agricultural policy as outlined by Johnson and Cochrane are repeated for the purposes of evaluation. They are:

(1) That resources should be used to maximum efficiency thereby yielding maximum social product.

(2) That a minimum level of income sufficient to maintain a minimum level of living should be provided for all. (Presumably this would be an arbitrary determination with reference to nutritional and other needs.)

(3) That the inequities in income distribution in the total economy and agriculture particularly should be reduced, or at least not worsen.

(4) That any particular group in society should receive a per capita income comparable to other groups, this goal defines the general agricultural income problem vis a vis the rest of the economy.

(5) That fluctuations in income should be lessened.

The goal of efficient resource allocation is emphasized by Professor Johnson almost to the exclusion of the income goals while Cochrane is much more concerned with goals four and five. Further it is clear that the income goals are generally applicable to the total economy.

1. Efficient Resource Allocation.--Even with the theoretical weakness of the marginal analysis used by Professor Johnson, it is possible that the reduction of price uncertainty in agriculture would contribute to a more efficient combination of resources within agriculture. But, as has already been shown, this reduction of uncertainty would likely be output increasing. This is because increased certainty is not likely to hasten the flow of excess resources out of agriculture. It seems clear that if lower returns to agricultural resources were the only corrective measure needed to reallocate excess resources to more profitable employments in the non-agricultural sector, the persistent existence of an income differential over the past two decades should have solved the farm problem. It is the contention of this thesis that factors other than economic return to resources retard the flow of resources out of agriculture. Therefore, the implementation of forward pricing while improving the use of the body of resources in agriculture would aggravate rather than improve the income problems of agriculture.

That supply control would increase the efficiency of resource allocation is unlikely. The intent of supply control, if successful, would be to raise farm prices sufficiently to yield a comparable per capita income in agriculture vis a vis the rest of the economy. Supply control would attempt to eliminate the differential in income

which provides a partial incentive to resource transfer. It was argued above that a lower return to agricultural resources was a necessary but not a sufficient condition for resource adjustment of agriculture. Farmers are not totally unresponsive to income differentials and price changes, as Professor Cochrane contends. The limited data dealing with the response of Canadian agriculture suggests that while labor may not have been moving out of agriculture at a rate sufficiently fast to improve agricultural incomes, there has been a significant decline in the agricultural labor force. Cochrane's case for a non-price responsive agriculture may to some extent rest on the fact that the parity programs have prevented farm prices from changing sufficiently to induce large adjustment in United States agriculture. It seems then that the raising of prices by a program of supply control would certainly not increase resource adjustment in agriculture and in all likelihood would reduce mobility. The resource implications of supply control in Canada could be serious. Given higher agricultural incomes and reduced uncertainty resulting from a program of supply control, there is reason to believe that the adjustment process which has been occuring in Canadian agriculture may be halted and possibly reversed. The persistent high level of unemployment in the Canadian economy over the past five years plus the existence of an undeveloped agricultural frontier in western and northern Canada, make the possibility of the increased employment of resources in agriculture arise. If supply control were not successful in totally controlling agriculture, the potential results of supply control program could be increased resource inputs and increased production of agricultural commodities. Certainly both these results are not desirable for Canada.

2. Income goals.--At the outset it must be made clear that three factors determine the income of farmers from agricultural pursuits; the quantity of resources owned or controlled by the farmer, the output from that body of resources and the price received for the output. Price policies generally contribute only to the third of these factors. Supply control could affect both the second and third, while forward prices could primarily affect the second of these factors. Neither policy affects the distribution of the ownership of agricultural resources. It follows then that if the subsistence farmer controls few and inferior resources, which produce little output that neither the policy of forward prices or supply control is going to contribute significantly to raising the minimum level of income of the marginal farmer. Supply control would contribute in the respect of raising the prices received for the commodities produced but at the same time would to some extent limit the quantity that could be sold. The sole contribution of forward prices would be in the area of increased output from the given body of resources. But as shown earlier, the increased output would likely command a lower price in the market. It therefore follows that neither supply control or forward prices would make any significant contribution to policy goals two and three. (See pp. 110 and 111.) Further, forward prices would not make a major contribution to goal four, that being the raising agricultural income relative to the rest of the economy. Supply control, in aggregate terms, would raise agricultural income; and if the labor force continued to decline or even held constant, agricultural per capita incomes would rise. This conclusion assumes that consumers will continue to consume the

same food basket at higher prices. But this rise in income would go to those producers who contribute the most output. It seems to follow then that Cochrane's program, while contributing to one of the policy goals, would aggregate another goal, i.e. inequality of income distribution in agriculture. Both policies could make some contribution to the goal of reducing fluctuations in agricultural incomes. This would arise primarily from the reduction in commodity price fluctuation arising from the implementation of either policy.

What then can be concluded about the effectiveness of the policies? Professor Johnson has explicitly stated that forward pricing is designed to meet the allocative problem,[11] and would make little contribution to the income goals he has outlined. This conclusion has been verified. Professor Cochrane postulated supply control as a solution to the price-income problem of agriculture. Supply control would raise aggregate agricultural income at the expense of some allocative efficiency. Supply control does not solve the problem of the low income farmer or of the disparity of income within agriculture. The success of the program of supply control then must be tested by weighing the costs, implicit and explicit, of the programs against the benefits of increased aggregate income.

IV. Costs and Economic Effects of the Programs

The discussion of costs and economic effects of the two policies will do little more than suggest areas where empirical measurement

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[11] D. Gale Johnson, "A Note on Resource Efficiency and Policy," op. cit., p. 123.

would be required to prove the conclusions reached. There are two types of costs to be considered, the direct costs of operating a farm program and the indirect costs of its implementation. In terms of direct costs it seems evident the supply control program would be the more expensive. The size of administration and policing unit required to carry on the program would of necessity have to be large. While it has been argued that forward pricing could probably be carried on with little change in the present Canadian administrative machinery, a program of supply control would require the expansion of the administrative unit. In that both programs would require a supplementary storage program it seems there would be little difference in the cost of the programs in this area. The basic difference in cost arises from the fact that forward prices are not designed to be an income support program, while supply control is.

One of Professor Cochrane's main arguments for supply control was to reduce the direct cost of the farm program to the United States Treasury, because as he argued, the American people likely would not continue to underwrite the high cost of farm price and income support. But supply control does not stop the transfer of income from the non-farm sector to the farm sector. The raising of agricultural income by supply control forces consumers to pay higher food prices. Thus the rest of the economy continues to subsidize agricultural income only in a different way. But this new way may be less desirable from the point of view of the rest of the economy. The effect of supplementing farm income by higher prices is in effect regressive taxation through

the market.[12] The financing of supply control by high food prices is regressive in that low income families, for which food is a major budgetary expenditure, would contribute relatively more to farm support than high income families. To the extent that present programs are financed by income tax, these programs show progressive taxation. It seems then that Cochrane's main purpose in advocating supply control, namely relieving the taxpayer of subsidizing agriculture, is illusionary. It seems logical to conclude that the overall cost of the implementation of either program could be greater than the cost of existing programs in Canada. This conclusion is based on the more comprehensive nature of the two programs. An empirical study would be necessary to substantiate this conclusion. Of the two, supply control would obviously be the more costly.

The general economic effects of both programs are difficult to assess although a few theoretical implications arise. If forward prices alone were implemented, as has been argued earlier, the result for agriculture would be increased production, lower prices and likely lower incomes.[13] But for the total economy the result would be a more efficient use of resources, lower food prices and therefore increased welfare. On the other hand, supply control would decrease general welfare in that resource adjustment would be retarded and food prices raised. Hathaway[14] has argued that supply control would

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[12] This point is effectively argued by D. Hathaway, "Potentialities and Limitations of Comprehensive Supply Control: An Independent Viewpoint," Journal of Farm Economics, XLII (December, 1960), 1190-1195.

[13] See above Chapter 4, pp. 74-75.

[14] Op. cit.

be inflationary in that one of the major factors which has prevented rapid inflation in the 1950's has been low food prices.[15] Conversely then forward prices would be anti-inflationary to the extent that food prices were lowered. It is not here suggested that a depressed agriculture should be maintained as a deflationary tool, but this evidence does suggest that, if lower farm incomes can be alleviated by methods of resource adjustment and direct support payments rather than by enhanced prices, a desirable effect may result for the economy generally.

But a further consideration must be made of a program which significantly raises food prices. The demand curve for food is not totally inelastic, nor is it likely to be inelastic at all prices. With very high food prices, demand could become quite elastic. This could arise for two reasons. First, consumers may substitute cheaper food for more expensive food to maintain constant expenditure. Second, high food prices could induce increased efforts to provide non-agricultural food substitutes. It is not inconceivable that food could be challenged by synthetics as has happened in the textile industry.[16] Cochrane has also given recognition to the possibility that changes in tastes could be induced by a long period of high prices.[17] The rapid decline of per capita butter consumption in Canada in the face of low priced competition from margarine adds support to the possibility of

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[15] For an analysis of the anti-inflationary effect of agricultural prices see Alvin H. Hansen, Economic Issue of the 1960's (New York: McGraw-Hill), 1960, p. 12.

[16] This case is made by W. E. Hamilton, op. cit.

[17] W. G. Tomek and W. W. Cochrane, "Long-Run Demand: A Concept, and Elasticity Estimates for Meats," Journal of Farm Economics, XLIV, (August, 1962), 717-730.

food pricing itself out of the market.

The most important difference in the economic effects of the two policies is the effect on efficient resource use. Forward pricing facilitates improved resource use but supply control in all likelihood would tend to hold agricultural resources in their present use. If the secular problem is movement of resources out of agriculture, then supply control could be deleterious in its effects.

A general evaluation can now be attempted. The policy of forward pricing is incomplete and would not solve the "farm problem" as defined. The policy not only rests on shaky theoretical grounds, but the benefits from more efficient resource allocations may be overshadowed by the increased output likely to occur and by the cost of incorrect price forecasts. Unless active supplementary programs of facilitating resource mobility, attacking the marginal farm problem and supporting incomes in the period of adjustment of labor out of agriculture are undertaken, a forward pricing program while workable, would be of questionable value to Canadian agriculture. The clinching point is the likelihood of political intervention in the price setting agency. Professor Johnson has himself explicitly recognized this likelihood.

> I believe that it is possible to describe a situation in which the basic idea of forward prices as a means of reducing the price uncertainty confronting farmers could be made to function in a way that would be superior to a completely free price system. However, I am not now convinced that the American political system provides a setting that would permit forward prices to function in a manner that would reduce uncer-

> tainty without also being used as a means of raising the general level of farm prices.[18]

If forward prices are not an anticipation of future conditions of supply and demand, they then become almost the same as the present United States program. The conclusion of this chapter is that the advantages of forward prices are outweighed by the disadvantages.[19]

The program of supply control is in theory more complete in that of forward prices because it attacks directly the major facet of the farm problem. But this policy also rests on shaky theoretical grounds, especially the theory of the treadmill as an explanation of agricultural supply response. Furthermore, supply control could have serious effects on resource movements out of agriculture. The direct cost of income support in this manner would be significantly higher than Canada has as yet spent on agriculture. Finally, Professor Cochrane's statement that if goals of a policy are desirable, means of implementation can be found, does not answer the important question of whether a comprehensive supply control program could be administered. While supply control on the surface may be an appealing proposal, closer examination suggests the disadvantages outweigh the advantages.

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[18] D. Gale Johnson, "Farm Prices, Resource Use and Farm Income," in Policy For Commercial Agriculture, Joint Economic Committee 85th Congress, November 22, 1957, pp. 45-77.

[19] Brownlee reached this same conclusion early in the period of development of the idea of forward prices. See O. H. Brownlee, "Some Considerations of Forward Pricing," op. cit.

V. Conclusion

What general conclusions can be drawn at this stage? Johnson[20] has concluded that the cost of the United States farm program in the postwar years has been fifty times as great as the Canadian program, while gross farm income in the United States has only been eleven times as great as Canadian income. For the same period, Johnson has argued that aggregate agricultural income vis a vis the rest of the economy has changed in Canada and the United States in relatively the same proportion. It therefore follows, according to Johnson, that the greater relative expenditure by the United States Treasury on agriculture through income support program has not significantly improved the relative position of agricultural incomes in the United States compared to Canadian farm incomes in the absence of this large expenditure. It can be concluded then that efforts to enhance agricultural income via the price system are likely to be unsuccessful for two reasons. First, income support via the price system goes to those farm units which commercially market farm products but as is intuitively obvious the group depressing average agricultural incomes are the marginal or subsistence farmers who sell relatively little output in the commercial market. It therefore follows that the disparity of income within agriculture is increased rather than lessened by income support through the price system. Secondly, income transfer via the price system may in fact deter the adjustment

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[20] D. Gale Johnson, "Income and Resource Effects of Canadian . . . ," op. cit.

of agriculture to the underlying problem of an excess of human and land resources in agriculture. Forward prices or supply control do not offer, in basic terms, a different approach for they both utilize the price system.

It is the conclusion of this chapter that neither policy is appropriate for the total solution of the Canadian farm problem. While forward prices may offer a program for price stability, it appears that the present program of deficiency payments in use in Canada provides a similar type of certainty without involving the forward fixing of prices. By this it is meant that market prices are allowed to move freely, differences between the support level and the market price are made up by direct payments. As a solution to the income problem of agriculture, it seems likely that forward prices might aggravate the present surplus problem, thereby lowering agricultural prices and income. Supply control as a policy of income support, it has been shown, is more complete in that it directly approaches the income disparity problem. The deliberate enhancement of food prices by supply control is still a transfer of income to agriculture by the non-agricultural sector. This transfer has the effect of regressive taxation, thus contrary to what Professor Cochrane argues, supply control does not reduce the cost of supports to the total economy but merely shifts the incidence. That neither policy contributes to the problem of the marginal farmer and more generally to the problem of income disparity is clear from the usage of the price system to implement the policies.

That neither policy is deemed desirable for Canada may be due in part to the inherent theoretical and operational weaknesses of the

two policies reviewed. But the main weakness is that common to all agricultural policies which attempt to use the market as a means of income support. In other words, a price policy of any nature other than one designed to mitigate price fluctuation, does not contain in it the elements for the solution to the "farm problem."

CHAPTER 6

CONCLUSIONS

This thesis set out to test the theoretical consistency of two specific price policies. The results of this testing have been to suggest that both policies are subject to theoretical weakness in their underlying economic models and further that the outcome of the implementation of the policies may not be desirable for Canadian agriculture. In this sense the results of this thesis are negative. In what follows a few general implications for Canadian agriculture arising from the study will be outlined.

At the beginning of this study it was stated that one of the inherent weaknesses of agricultural policy discussions was the tendency to consider agriculture as a homogeneous unit with a uniform problem. Canadian agriculture is a complex unit of 480,000 farmers, scattered from Newfoundland to Vancouver Island, producing a vast variety of commodities. To consider this group as having uniform interests in the formulation of national policies is essential but at the same time invites difficulties. Professor Cochrane, especially, demonstrates a strong propensity to consider agriculture as a homogeneous unit, to identify a uniform income problem in agriculture and then to seek a solution through raising commodity prices by limiting output. This approach ignores the regional differences in agriculture.

As Professor Mackenzie[1] has shown, great disparities in agricultural income exist between regions in Canada. The Maritime region has primarily a subsistence farm problem, while the Prairies, for example, have suffered from extreme income fluctuations, resulting from the dependence of grain production on weather conditions. It therefore follows that the economist in the formulation of policy models must take cognizance of these differences. This is not to suggest that a general agricultural policy cannot be derived. But rather the first task of policy is to derive general goals and then determine the effects of all policies on these goals. If the goals of policy are generally to reduce agriculture's vulnerability to factors beyond its control, such as weather, price fluctuation and business cycles, while at the same time facilitating the adjustment of agriculture to changing conditions, then all policies must be as consistent with each other as is possible. To concentrate on the income disparity problem, as does Professor Cochrane, to the exclusion the secular adjustment problem, invites serious inconsistencies in policies. The first major implication of the study then comes into focus. Agricultural policy must be considered in a broad overall view before specific policies are implemented and more important the general goals of policy must not be lost sight of when evaluating specific programs. That Canadian policy has lacked this overall purposeful direction seems clear from the nature of existing policies, namely a collection of legislation, some of it of an emergency nature, passed to meet immediate problems.

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[1] Mackenzie, The Changing Cost Structure. . . , op. cit.

The second implication is that of distinguishing between the short-run and long-run implications of policies. Both the policies of forward prices and supply control show much preoccupation with short-run problems. Professor Johnson is concerned with price uncertainty in the short-run and is much less concerned with tracing out the long-run implications of increased resource efficiency on the agricultural sector. Similarly, Professor Cochrane is prepared to, for all intents and purposes, ignore secular adjustment in agriculture, in the pursuance of the immediate objective of raising farm incomes. This later conclusion is very obvious in Cochrane's attempt to explain agricultural price response using a six year period.

It is clear that agriculture is slow to respond to changing conditions, but failing to consider the secular adjustment question as Cochrane does, leads him to postulate the questionable theory of the treadmill. While empirical data does show erratic shifts in agricultural output, these shifts might be partially explained by factors outside of agriculture, such as war, depression and drought, which have sporadically occured in the last three decades. Mackenzie has argued, quite plausibly, that in the last thirty years agriculture may not have had sufficient time between world upheavals to fully adjust before it had to start over. It is interesting to speculate, for example, that an unusual combination of events in Western Canada in 1961-62 may disrupt the adjustment process by driving the grain supply function outward. These events, a drought in Western Canada, a crop failure in Communist China and the devaluation of the Canadian dollar all contributed to a sharp rise in Canadian grain prices.

This rise in prices, coupled with the Minister of Agriculture's exhortation to farmers to "plant all the wheat you can," may cause an expansion of agricultural output, which once these short-run events are passed, will again put Western grain producers in the position of holding large surpluses of grain.[2] As Cochrane himself has said, policy must of necessity be a compromise between conflicting interests and goals, yet he has not heeded his own good advice. Long-run problems must not be lost sight of in considering agricultural policies.

This conflict in aims is not limited to policies specific to agriculture. Professor Cochrane especially is explicit in saying that agriculture can be considered as a "water-tight compartment." This is certainly a weakness in a discussion of a complete policy. For rather than agriculture becoming more isolated from the rest of the economy the opposite has occurred. Not only does agriculture rely on the rest of the economy for the sales of farm products, but to an increasing extent depends on the industrial and service sectors for productive inputs. The importance of agriculture to the rest of the economy, especially the export sector, is well established. It therefore follows that agricultural policy must take into consideration the interrelationship of agriculture and the rest of economy. Professor T. W. Schultz, University of Chicago, has emphasized this interrelationship.

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[2]Seeding estimates for 1963 suggest that in excess of 27 million acres of wheat will be seeded in Western Canada this spring. This is the largest seeded acreage since 1940. If this crop should yield the average yield of the last ten years (20 bushels per acre) the crops produced would be 100 million bushels in excess of domestic and foreign disappearance at normal prices.

> Agricultural leaders (and some economists) have been altogether short sighted concentrating so much attention on the current level of farm prices and income and overlooking the serious adverse implications to their welfare, of the high rate of unemployment and mistakes in monetary and fiscal decisions that lie back of this excessive unemployment.[3]

Perhaps the most significant aspect of the study has been to re-emphasize the limitations of price policy in solving the general farm problem. While it is clearly desirable to mitigate the vulnerability of agriculture to extreme price fluctuations, a program of highly supported prices will not solve the long-run secular adjustment problem of agriculture. The adjustment of agriculture to the rapid changes in technology has been phenomenal. The rate of outflow of agricultural labor has been rapid and consistent, yet the replacement of men with machines has occurred at an even more rapid rate. Despite arguments to the contrary, the basic farm problem in simplest terms is an excess of resources in agriculture. Agriculture in a maturing economy inevitably will play a declining role. This is so because of the low price and income elasticity of the demand for food, which retards the expansion of consumption in a wealthy society. In addition, modern society has developed technically to the stage where more food can be produced with substantially less man power. But this decline is a secular one which has been in progress at an accelerated rate for the last thirty years and is not yet nearing its completion.

The differential in income between farm and non-farm occupations

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[3] T. W. Schultz, "A Policy to Redistribute Losses From Economic Progress" in Labor Mobility and Population in Agriculture (Ames: Iowa State College Press, 1961), 166.

has been substantial throughout this period of rapid adjustment. But it seems clear that a widened differential would not hasten the flow of labor out of agriculture.[4] The question that then arises what factors other than wage differentials affect labor flows out of agriculture. It has been forcefully argued by Bishop[5] that outflows are largely determined by the availability of employment in the non-farm sector. This is not the place to discuss the relative merits of possible programs to improve the mobility of agricultural labor. Clearly though, the maintenance of a growing, full employment economy is of no small importance to the solution of the farm problem. It is suggested then that much broader thinking is required in the Canadian approach to agricultural policy and that one area needing substantial study is that of agricultural labor mobility and the factors holding labor in agriculture. Present day concepts of justice and equality will not allow the subsistence element of agriculture to be ground slowly into bankruptcy, by the free price system. It therefore follows that a positive policy is required to lessen the burden of adjustment on the members of the agricultural labor force.

Conclusions

It seems clear that government in Canada will be involved in the agricultural sector permanently. Given this situation positive long-run policy goals should be considered carefully. Of vital impor-

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[4] D. Gale Johnson, "Competition in Agriculture," op. cit.

[5] C. E. Bishop, "Economic Aspects of Changes in Farm Labor Force," in Labor Mobility and Population in Agriculture (Ames: Iowa State College Press, 1961), pp. 36-49.

tance in setting these goals is the recognition by economists, farmers and government, that the farm problem is not an economic problem alone. The problem of excess labor in agriculture requires careful attention, especially those non-economic factors which hold labor in agriculture. The Agricultural Rehabilitation and Development Act (ARDA) is a step in the right direction in that it attempts to attack the social as well as economic factors causing the farm problem. But the agricultural problem cannot be solved if ARDA adheres to its goal of the maintenance of the present population in agriculture. Policy should continue to reduce the extreme vulnerability of the farm population to income variations. But at the same time the limitations of price policies should be borne in mind by government. Finally, careful attention must be given to the interrelationship between various agricultural policies. Each of these policies, in that they are directed at some part of agriculture, will interact.

This thesis did not intend to produce a policy for Canada, but it rather indicates a direction of approach. Its purpose was to discuss extensively the merits of two price policies if applied to Canada. It has been found that neither is a total solution to the farm problem. The implications of the analysis are general but are felt to be important. The agricultural problem is a complex economic and social one which is not isolated from the problems of the total economy. Agricultural policy in Canada should be broad, and it should be clearly recognized that agriculture is an integral part of the Canadian economy and not a sector which can be dealt with in isolation.

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